



TAMPEREEN TEKNILLINEN YLIOPISTO
TAMPERE UNIVERSITY OF TECHNOLOGY

TOPI AURA

ASSESSMENT OF MANAGERIAL INFORMATION NEEDS AS A
BASIS FOR BUSINESS INTELLIGENCE DEVELOPMENT

Master of Science Thesis

Examiner: Professor Samuli Pekkola
Examiner and topic approved by the
Council of the Faculty of Business
and Built Environment on August
12th, 2015.

ABSTRACT

TOPI AURA: Assessment of Managerial Information Needs as a Basis for Business Intelligence Development

Tampere University of Technology

Master of Science Thesis, 108 pages, 2 Appendix pages

May 2016

Master's Degree Programme in Information and Knowledge Management

Major: Business Information Management

Examiner: Professor Samuli Pekkola

Keywords: business intelligence, business performance management, decision-making, information need, information need assessment

Performance is an important measure for all organizations as it describes how well an organization reaches its goals. An organization's performance can be improved with better-informed and more accurate managerial activities such as decision-making. Business intelligence (BI) is in a central position in supporting these activities. The BI process begins with the identification of information needs, which is the most important step as it guides the whole process. Performance information needs are dependent on the decision-makers' roles and tasks as well as contextual and multiple other factors.

This study is conducted for a Finnish company which will be referred to as the target organization. The target organization is a professional service company providing IT and business consulting services. This study examines the team managers' performance information needs and the target organization's capabilities in meeting these needs. The requirements for future BI development will be identified based on the collected data. The research strategy in this study derives from a case study perspective, and the used data collection methods are focus group discussions and semi-structured interviews.

The information need assessment was conducted with the help of a business performance management framework developed as a part of this study. The study indicated that from the six performance perspectives acknowledged in this framework, the target organization's BI is mostly focused on the perspectives of finance, customer and internal process. At the same time, especially the information needs regarding the perspectives of environment, learning and growth and people are inadequately satisfied.

The results suggest that the target organization's BI is in an early stage of its maturity. As a conclusion, this study recommends the target organization's BI operations and capabilities to be developed in two steps. In the first step, the focus of the development should be on satisfying the basic information needs identified in this study. In the second step, new BI capabilities, such as data warehousing, are introduced, so that the team managers' future needs for performance information can be satisfied.

TIIVISTELMÄ

TOPI AURA: Johdon tietotarpeiden analysointi liiketoimintatiedon hallinnan kehittämisen perustana

Tampereen teknillinen yliopisto

Diplomityö, 108 sivua, 2 liitesivua

Toukokuu 2016

Tietojohtamisen diplomi-insinöörin tutkinto-ohjelma

Pääaine: Tiedonhallinta

Tarkastaja: professori Samuli Pekkola

Avainsanat: liiketoimintatiedon hallinta, liiketoiminnan suorituskyvyn johtaminen, päätöksenteko, tietotarve, tietotarvekartoitus

Suorituskyky on tärkeä mittari kaikille organisaatioille, koska se kuvaa miten hyvin organisaatio kykenee saavuttamaan sille asetetut tavoitteet. Organisaation suorituskykyä voidaan parantaa tarjoamalla johdon työtehtävien, kuten päätöksenteon, tueksi tarkempaa ja relevantimpaa tietoa. Liiketoimintatiedon hallinta (BI) on keskeisessä asemassa näiden tehtävien tukemisessa. BI-prosessi alkaa tietotarpeiden kartoituksesta, joka on prosessin tärkein vaihe, sillä se ohjaa prosessin myöhempiä vaiheita. Suorituskyvyn johtamisen tietotarpeet ovat riippuvaisia päätöksentekijän roolin ja tehtävien lisäksi myös kontekstista sekä useista muista tekijöistä.

Tämä tutkimus toteutettiin toimeksiantona suomalaiselle yritykselle, johon tässä tutkimuksessa viitataan termillä kohdeorganisaatio. Kyseessä on asiantuntijayritys, joka tarjoaa konsultointipalveluita IT:n ja liiketoiminnan osa-alueilla. Tutkimuksen tavoitteena on kartoittaa ja arvioida kohdeorganisaation tiimipäälliköiden suorituskyvyn johtamisen tietotarpeet sekä kohdeorganisaation kyvykkyys vastata näihin tarpeisiin. Kerätyn tiedon perusteella tunnistetaan myös vaatimukset BI:n kehittämiseksi. Tutkimusstrategiana tässä tutkimuksessa on tapaustutkimus ja tiedonkeruun menetelminä hyödynnetään fokusryhmähaastattelua sekä puolistrukturoituja yksilöhaastatteluita.

Tietotarvekartoitus toteutettiin hyödyntämällä tämän tutkimuksen aikana kehitettyä liiketoiminnan suorituskyvyn johtamisen viitekehystä, joka jakaantuu kuuteen suorituskyvyn näkökulmaan. Saatujen tulosten perusteella kohdeorganisaation BI on keskitynyt pääasiassa talouden, asiakkuuksien ja sisäisten prosessien näkökulmiin. Sen sijaan varsinkin ympäristön, oppimisen ja kasvun sekä henkilöstön näkökulmiin liittyvät tietotarpeet ovat puutteellisesti täytetty.

Tutkimuksen mukaan kohdeorganisaation BI on kypsyydeltään varhaisessa vaiheessa. Tämän tutkimuksen johtopäätöksenä kohdeorganisaation liiketoimintatiedon hallintaa ja sen kyvykkyyttä suositellaan kehittämään kahdessa osassa. Ensimmäisessä vaiheessa kehittäminen tulee kohdistaa tässä tutkimuksessa havaittujen perustietotarpeiden tyydyttämiseksi. Seuraavassa vaiheessa tulee kehittää uusia kyvykkyyyksiä, kuten tietovarastointia, joilla kyetään vastaamaan tiimipäälliköiden tuleviin tietotarpeisiin.

PREFACE

Writing this thesis has not been the easiest journey of my life but it has taught me a lot and not just about the field of studies. Despite all the sleepless nights, looking back brings me joyful memories.

The research was supervised and examined by Professor Samuli Pekkola from Tampere University of Technology and the supervisor from the target organization. I would like to thank both of these gentlemen for the positive feedback and encouragement throughout the research. In addition, I would also like to thank all interviewees for their time and effort.

Special thanks to my dear friends for their support and patience. Your repeatedly presented question "*When will you graduate?*" has been a great motivator. I feel relieved for finally being able to answer this question.

Especially I would like to thank my family for all the love and support that they have provided throughout my studies, all the way from the first grade to this day. Without your help I would not have been able to achieve this.

Most importantly of all, I want to thank Johanna. You have always been incredibly supportive. Nobody believes in me more than you do. Thank you very much for that.

Tampere, 25.5.2016

Topi Aura

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APPENDIX 1: INTERVIEW QUESTIONS

TERMINOLOGY

BI	Business Intelligence includes the processes, techniques, and tools used to support decision-making (Hannula & Pirttimäki 2005).
BPM	Business Performance Management (see PM).
BSC	Balanced Scorecard, a performance management and measurement framework (Kaplan & Norton 2005).
Data warehouse	DW is a special type of database designed especially for analytics purposes and to enable the aggregation of data from multiple transaction databases.
Decision-maker	A person making a decision. This person might not be in a managerial position but in this study this term refers to managers on different managerial levels.
ERP	Enterprise Resource Planning
HRM	Human Resource Management
Information	In this study, the term information refers to a broad definition of information, including the concepts of data, information and knowledge.
Information need	Information which is needed to perform a certain task or to make a certain decision (Laihonen et al. 2013).
Information need assessment	A process which is used to determine the information needs of a predetermined group of people.
Performance	Performance is a measure which describes how well organization reaches its goals (Lönnqvist 2004).
PM	Performance management is about defining, controlling and managing both the achievement of outcomes as well as the means used to achieve these results (Broadbent & Laughlin 2009). Besides this overall term, synonymous terms of Business Performance Management (BPM), Corporate Performance Management (CPM) and Enterprise Performance Management (EPM) are often used.
PSA	Professional Services Automation
SME	Small and medium-sized enterprise

1. INTRODUCTION

*“100 % of employees are people, 100 % of customers are people,
100 % of vendors are people, 100 % of all stakeholders are people.
If you don't understand people, you don't understand business.” - Simon Sinek*

1.1 Background of the research

An understanding of the people inside and outside an organization is a prerequisite for successful business operations as highlighted in the quote above. From the business intelligence (BI) perspective, this understanding can be seen as the organization's ability to identify and satisfy the information needs of its decision-makers with relevant and timely business information. In addition to the people, technology and information are therefore also important organizational resources (Chaffey & White 2011, p. 3-7). All of these resources have an important role when developing an organization's BI capabilities. The value of information is particularly highlighted in the performance improvement viewpoint (Chaffey & White 2011, p. 3-7).

Information need assessment is a fairly common business activity in many organizations (Watkins et al. 2012, p. 15). These assessments are conducted in order to gain a comprehensive understanding of the information needs of a certain group of people. These groups are formed based on suitable characteristics, for example the occupation or profession, because in this way the members of the group usually have broadly similar information needs which can then be generalized and satisfied efficiently (Dorner et al. 2015, p. 33-34). One group which is often the focus of information need assessment are the managers who are also the key decision-makers of the organization.

Nowadays, decision-making is seen as one of the most important tasks of managers, among multiple other managerial tasks and responsibilities (Nedelko 2009, p. 219). Information need assessment can therefore be seen as an important tool in supporting managerial work. The importance of decision-making has grown due to the complex and fast changing business environment (Nedelko 2009, p. 219). Besides environmental complexity, also the speed of communication has simultaneously increased and reduced the amount of time available for decision-making (Thierauf 2001, p. 65). While making decisions, managers are required to balance between the conflicts of multiple aspects caused by organizational structure, budget limitations, production efficiency requirements, surprising changes in production, changing customer needs and future investments and innovations (Mayer & Quick 2015, p. 17).

Business intelligence helps organizations' decision-makers in making faster, better and more informed business decisions on all organizational levels by providing relevant information based on the identified information needs (Thierauf 2001, p. 16, 22). The applicability of BI is not tied to the size of the company and it can therefore be leveraged in all companies to further its objectives, goals and strategy (Thierauf 2001, p. 16, 22). The value to the organization can be created by improving information quality, information flows and knowledge sharing which affect decision-making and ultimately the performance of the organization (Chaffey & White 2011, p. 3-7). Performance, which describes the organizations' ability to reach its goals, is a central measure for all organizations (Lönqvist 2004, p. 27).

The need to conduct this study derived from the target organization. The target organization had recently implemented a new professional services automation (PSA) system which affected the current BI processes, such as reporting. In addition, the requirements for business intelligence had also grown due to the internationalization and growth of the business. There was a need to enhance these capabilities, as not all of these requirements could be satisfied with the information systems, tools and processes included into the target organization's BI. As noticed earlier, the identification of information needs has a central role when developing BI. For this reason, the information need assessment conducted as a part of this study can be seen as the first step in the target organization's BI development.

This study is the first time managerial performance information needs are systematically studied in the target organization. This thesis focuses on studying the information needs of the team managers, because the decisions and other managerial tasks on the operative level significantly affect the performance of the target organization. Before the study, the target organization had quite little knowledge on how well the team managers' needs were satisfied. The supposition was that some of their basic performance information needs could be satisfied but not well enough to effectively support the achievement of the target organization's internationalization and growth objectives. This highlighted the need for a systematic information need assessment and the overall BI development. Information need assessment is a complex process and requires the participation of multiple people with different roles and expertise (Watkins et al. 2012, p. 247). Besides involving multiple members from different managerial levels of the target organization, the researcher's own experiences and knowledge of the study subject are also leveraged, as the researcher has been a member of the target organization for three years.

1.2 Objectives and research question

The main objective of this study is to identify and describe the target organization's team managers' information needs in the area of business performance management. The secondary objective is to compare these information needs with the current information offering and to define the requirements for the development of business intelligence capabilities so that managerial information needs can be satisfied more efficiently in the future.

Thus, the research question is:

What information needs do team managers have in the area of business performance management? What kind of business intelligence capabilities need to be developed in order to support the team managers' work and the performance improvement of the organization more efficiently?

Even though the main objective for the study is to conduct an assessment of the team managers' performance information needs, a development perspective described as a secondary objective plays a key role as well. At this point, a current state assessment of the target organization's business intelligence capabilities is conducted by comparing the identified information needs with the current information offering. These findings can then be used to describe the requirements for the development of business intelligence capabilities.

1.3 Themes and scope

This study consists of four themes which are business information, business intelligence, managerial decision-making and managerial information needs. The overall viewpoint of the study is business performance management. These themes and the viewpoint are illustrated in Figure 1 and examined more closely during the theoretical part of this study.

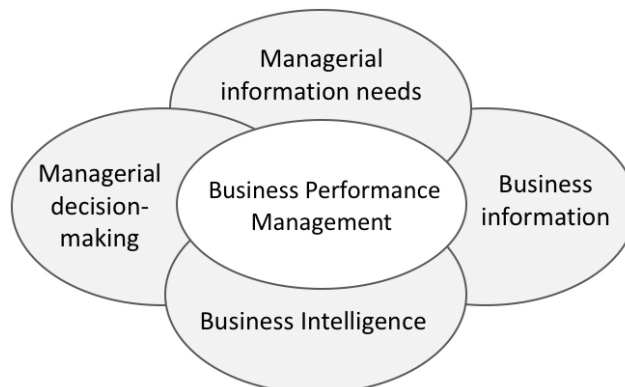


Figure 1: Four themes and viewpoint of the study.

Managers working on different managerial levels encounter a great number of information needs as a result of the tasks assigned to them. During this study, the focus is on the information needs related to business performance management. Despite the fact that all employees can be considered to be decision-makers, not all information needs will be assessed during this study. This study is focused on identifying and assessing the information needs of managers' especially in the team manager position. The information needs of other managers working on an operative managerial level, such as project managers and principal consultants, will not be covered in this study. Similarly, the performance information needs of senior managers, board members and external stakeholders are outside of the scope of this study.

This study focuses on the information needs related to managerial tasks, such as decision-making, as these tasks have a high effect to the performance of the target organization. Performance management related decisions affect all members of the target organization and can therefore be considered as a top priority to support. This study recommends which of the team managers' performance information needs should be addressed first in order to support performance management activities more efficiently.

This research works as a basis for the development of business intelligence in the near future. The current maturity level of BI operations and the requirements for the development are recognized during this study. However, detailed information about the BI development project, such as business intelligence system implementation, will not be covered in this study.

1.4 Overview of the target organization

This study is conducted for a Finnish company which will be referred to as the target organization during this study. The target organization operates in the field of IT and business consulting and employs over 150 consultants, technical experts and software developers (Target organization's annual report 2015). The turnover in 2015 was near 20 million euros and the operation is profitable (Target organization's financial statement 2015).

The target organization provides professional services in a focused area of IT and business. The customers are mostly medium and large-sized public and private sector companies which cover the majority of the Finnish Top 100 companies as well as a large number of others. The assignments are both domestic and international, as target organization has assignments in over 30 countries a year (Target organization's annual report 2015). The business model is highly dependent on the expertise of the company's employees as the company operates in the service business. The operation is mostly project based, but the turnover of continuous services has grown from year to year (Target organization's annual report 2015).

The target organization is growth oriented and therefore the sales are supported by a professional sales team in addition to the sales work done by team managers and other members of the organization. The target organization has substantial objectives for profitable growth as the target is to yearly increase the turnover by xx percent and to keep the operating margin over xx percent (Target organization's annual report 2015). In order to support growth, the target organization made an acquisition recently which increased the number of employees by over 30 percent. Besides this, the company recently expanded its business operations to another European country (Target organization's financial statement 2015) and has recruited multiple employees to run its operations. During 2016, the target organization is looking for an opportunity to expand its business operations to other European countries as well (Target organization's annual report 2015), which may be carried out through acquisitions or by utilizing green field investments and in this way building a company from fresh.

The target organization's operations are organized in a non-hierarchical matrix structure. The organization structure is therefore very flat and the members of the management team have a direct and constant communication with consultants and other members of the organization. In this way, all members are more or less involved in the decision-making process, and the satisfaction and motivation of the professionals are seen as a high priority. The operational work is carried out in several specialist teams which are formed based on the expertise areas and provided services (Target organization's annual release 2015). What is unique to the organization is that its economic performance and operations are measured only at a company level, as team or business unit level profit centers are not used. This is one of the reasons why co-operation and joint projects between members of different teams is very common. Nevertheless, major differences between the information needs and ways of working are known to exist between teams.

1.5 Research approach

The research approach or research design of the study is illustrated in Figure 2 by modifying the layers of the research onion presented by Saunders et al. (2009). The research methodology choices derive from the research problem and the objectives defined earlier. The factors affecting the choices are constraints for the study; available data, time, money and location (Saunders et al. 2009, p. 137). In this study, especially the scope of the research affects the research methodology choices.

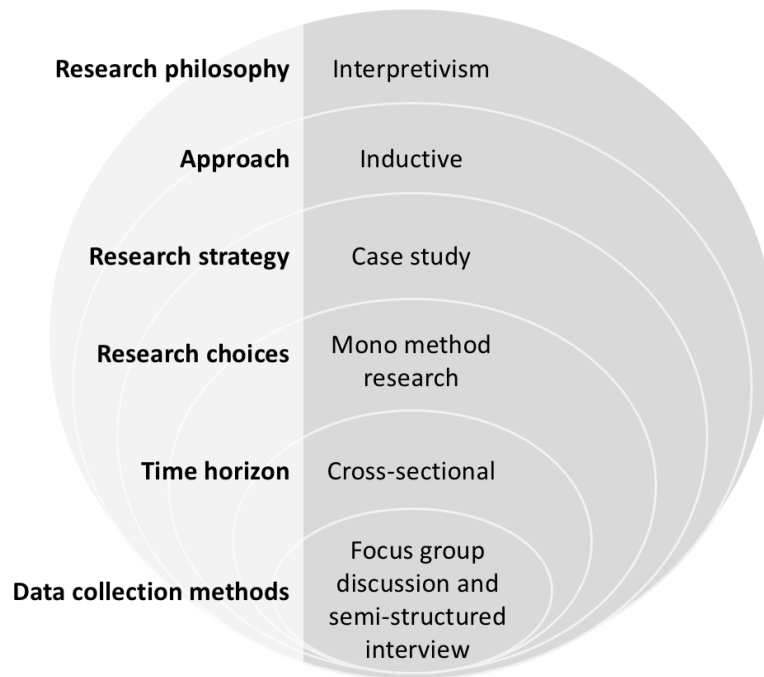


Figure 2: Research methodology of the thesis. Research onion adapted from Saunders et al. (2009).

Research philosophy

The research philosophy of this study is interpretivism. This method acknowledges the researcher as an active member or even as a participant in the investigated subject, and not just an external observant. This research philosophy differs from others in how data is interpreted during the analysis phase. Interpretation is done by leveraging the researcher's own experiences of the study subject and subjectivity, involvement and closeness are encouraged. (Farquhar 2012, p. 19-20). As the researcher has been a member of the target organization for three years, interpretivism is a natural choice.

Approach

The general plan or strategy on how the research question will be answered is defined by the research approach of the study (Maylor & Blackmon 2005, p. 154). This study will be conducted as an inductive research. One of the reasons is that it enables an exploration and a creation of understanding better than deductive logic (Farquhar 2012, p. 25). When inductive approach is followed, theory will be generated based on the findings of the research data. In other words, the researcher will collect data from multiple aspects of the researched area so that a theory can be induced by analyzing the data. (Maylor & Blackmon 2005, p. 152). As this study is not purely inductive, the approach could as well be considered abductive reasoning. What it means is that instead of relying on pure inductive or deductive logic, more value will be given to tentative explanations (Willis et al. 2007, p. 215). Nevertheless, this study is defined as inductive as it mostly follows inductive reasoning.

Research strategy

The research strategy and strategic decisions in this study derive from a case study perspective. The case study research strategy defines the overall direction of the study and all choices made during the study will be based on it (Farquhar 2012, p. 8). The aim of a case study is to investigate and illuminate a contemporary phenomenon in a certain context, adding that, the boundaries between the studied phenomenon and context are not clearly evident (Yin 2009, p. 18). Case study has been chosen as a research strategy because the aim is to study the team managers' information needs in the area of business performance management (phenomenon) in the target organization (context). The case study research method is well suited to answer especially the questions beginning with the words of *why*, *what* and *how* (Saunders et al. 2009, p. 146), which ensures that this method is suitable for answering the research question of the study.

Case study research can be used to investigate a single or multiple cases at the same time. This study focuses on investigating the decision-makers' information needs in a single organization by focusing on the information needs of managers in the operative managerial level. Data collection will be conducted throughout the organization, which enables a comprehensive review of the managerial needs. This includes team managers from multiple teams and also some members from the top management. Saunders et al. (2009, p. 147) refers to this kind of research as an embedded case meaning that a number of logical sub-units will be involved in the study.

Case study is suitable for multiple applications. The aim of this research method is to explain, describe, illustrate or enlighten the studied topics in the defined context (Yin 2009, p. 19-20). In this study, the application is both descriptive and illustrative as the objective for the study is to describe managerial information needs and to illustrate overall recommendations for the development of business intelligence capabilities. This choice is also in line with the inductive approach of the study.

The use of a case study research method is often criticized. At first it was not even considered to be a formal research method at all. The critique focuses mostly on the lack of scientific rigour and the little generalization case study research offers (Yin 2009, p. 14-16; Farquhar 2012, p. 10). Farquhar (2012 p. 10) also adds the lack of large sample sizes and objectivity to the list of criticized factors. Some critique is also concerned with how time-consuming the method is, the study report format and the use of a case study research method for purposes it is not suitable for. (Yin 2009, p. 14-16)

Despite the critique, the case study research method is widely used and offers a robust foundation for the study. According to Farquhar (2012), the strength of case study research relies on its ability to find answers to research questions that are closely connected to a certain context or situation. The research findings can be strengthened by using multiple data collection methods or sources of data so that the evidence is triangulated.

This can be achieved by using both survey and interview data collection methods or by combining data from primary (interview data) and secondary (industry report) data sources during the study. (Farquhar 2012, p. 6-8). A robust foundation and support for arguments is achieved in this study by gathering data with multiple data collection methods and by taking the literary findings into consideration while analyzing the data.

Research choice

Research choice describes the qualitative or quantitative techniques and procedures used in order to answer the research question of the study. More specifically, this refers to the data collection and analysis methods used in the study. (Saunders et al. 2009, p. 151). A case study can be classified as qualitative or quantitative research or it can be a mix of both (Yin 2009, p. 19). As elements of quantitative research have a considerably less significant role in this study compared to the qualitative part, this study can therefore be defined as a mono method research.

Time horizon

Team managers' information needs are constantly evolving. Therefore, a study performed over a period of time, which Farquhar (2012, p. 7) refers to as longitudinal study, could enable the formulation of a strong understanding regarding changing needs. Nevertheless, there is a need to understand the current situation in order to enable the development of business intelligence capabilities. For this reason, the time horizon of the study is defined as cross-sectional. Case studies based on cross-sectional time horizon usually have the data collected over a short period of time (Saunders et al. 2009, p. 155).

Data collection methods

The data in this study will be collected by utilizing the methods of focus group discussions and semi-structured interviews. As a part of the focus group discussions, members of the senior management are interviewed in order to identify the main information themes and information needs by taking into consideration all relevant performance perspectives as well as the target organizations' strategy. The findings made during these discussions will be assessed and then supplemented during the semi-structured interviews. In this way, the interviews deepen the existing understanding of the team managers' performance information needs. Qualitative data collection and analysis methods will be utilized while analyzing the findings of the study.

1.6 Structure of the study

This study consists of four parts which are introduction, theoretical discussion, empirical study and conclusions. Figure 3 presents the structure of the study on more detailed level as the content of each chapter is shortly described.

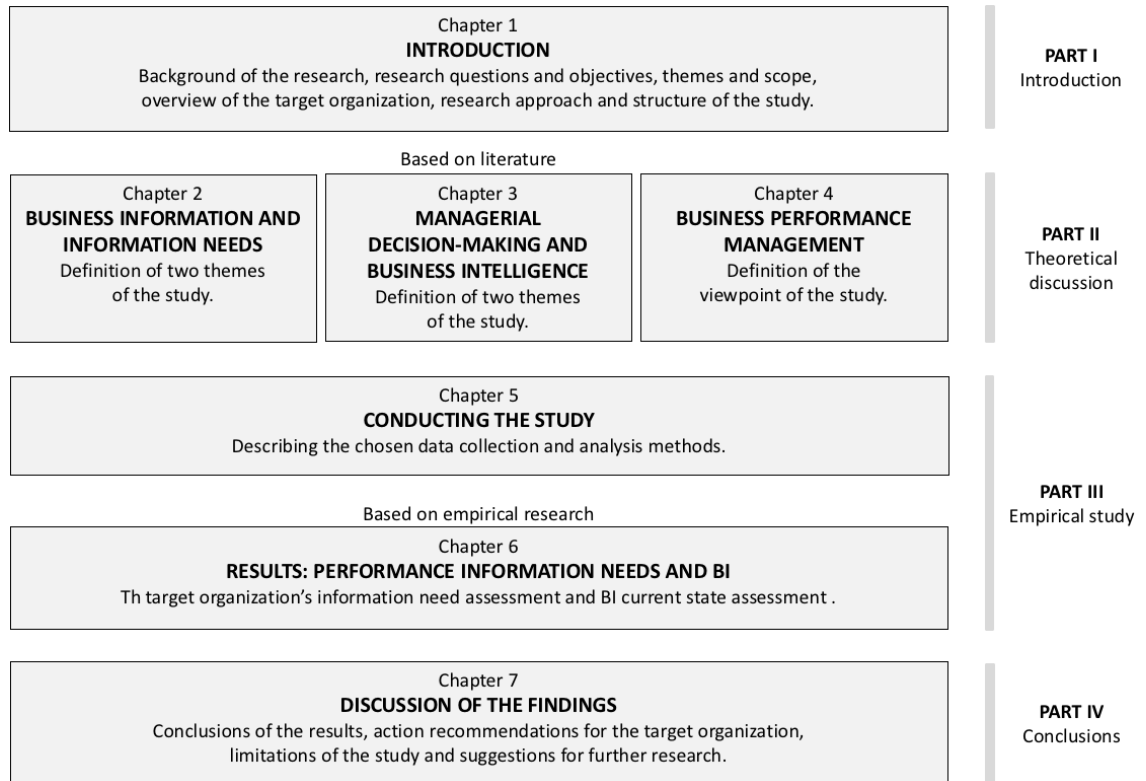


Figure 3: Structure of the thesis.

2. BUSINESS INFORMATION AND INFORMATION NEEDS

This chapter defines two of the four main themes of the study: business information and information needs. The chapter begins by looking into the different levels of information. After that, information needs and information seeking behavior are reviewed from a managerial perspective. At the end of this chapter, information need assessment and different characteristics of information needs are described.

2.1 Business information

The information about a company's own operations as well as the business environment affecting these operations, such as customers, competitors, markets and multiple other factors, are generally referred to as business information (Vuori 2006, p. 313). All information produced and used by the organization is considered to be business information regardless of the source of this information (Laihonen et al. 2013, p. 45). Continuous need for business information is present in all organizations as this type of information is required to maintain daily business operations and a competitive advantage.

Before the concept of information need can be examined, the overall term of information is to be defined. Typically, the concept of information is defined by looking into the different levels of information, including data, information, knowledge, intelligence and sometimes also wisdom and truth (Hannula & Pirttimäki 2005, p. 34). This well-known categorization and the relations between the different levels are often represented with a hierarchical pyramid. The items on the top (knowledge, wisdom and truth) are seen more valuable to the organization than the ones they are built upon (data and information).

Despite the clear difference between the terms of data and information, they are often used synonymously (Daconta 2007). Organizations possess a great amount of raw facts, such as numbers, symbols and figures about their processes, products, services, customers and competitors. These facts are called data which can be transformed into information by analyzing it (Chaffey & White 2011, p. 164, 209), which puts the data into a context (Bailey & Clarke 2000, p. 236). Information can be presented, for example in a form of tables and charts of statistics, which enables communication and the use of information (Rouse 2002, p. 283). Information can be seen as a means to reduce an individual's uncertainty (Bouazza 1989, p. 145), which is especially meaningful when ex-

amined from the decision-making point of view. Therefore, in this study uncertainty is the result of a lack of information at managers' disposal when performing a certain task or making a certain decision.

Information is transformed into knowledge with the help of meaningful interpretation (Bailey & Clarke 2000, p. 236). During this transformation, the human mind processes received information into a form of conclusions and explanations (Rouse 2002, p. 283), which increases the interest of users (Bailey & Clarke 2000, p. 236) as knowledge has a higher value to the organization and its information users. By utilizing knowledge, not only the question "what", but also the questions "why" and "how" can be answered (Rouse 2002, p. 283). As the perceived significance of certain information is dependent on the persons' previous knowledge, this knowledge may not always be correct. Therefore, an expert's opinions, skills and experience are needed before information is capable of improving the effectiveness of decision-making (Chaffey & White 2011, p. 209-210). In order for knowledge to be usable, it needs to be current, relevant and actionable to the manager responsible for making the decision (Bailey & Clarke 2000, p. 236). Unfortunately, traditional information systems and databases rarely have the capabilities to capture and store knowledge (Rouse 2002, p. 284) in the same way that they process data and information, which complicates knowledge sharing. In this study, the terms data, information and knowledge are referred to with the more general term information.

2.2 Information need, want, and use

Information need is not a new concept as it has been studied since the 1920's especially in the context of libraries. In the 1960's, the research expanded to investigating business information needs (Vuori 2006, p. 311) and nowadays the assessment of information needs is a fairly common business activity in many organizations (Watkins et al. 2012, p. 15). Despite the long history, the term information need is often found vague and complex (Nicholas 2005, p. 19). Choo (2002, p. 26) even describes this term with the words contingent, dynamic and multi-faceted.

The confusion related to the term information need is at least partly due to the difficulties in defining the concept of information (Wilson 2006, p. 659) as noticed in the previous chapter. Therefore, it may be easier to build the definition by first defining the term need. At its simplest, a need can be seen as something people must have (Vuori 2006, p. 313). More specifically, a need is a learning or a performance gap that is in between the current and the desired condition (Sleezer et al. 2014). An information need, on the other hand, is a gap between the current information and the information required to perform a certain task or to make a certain decision (Laihonen et al. 2013, p. 25).

People commonly use the term information need when actually referring to the want or use of information. This is understandable since these terms are not completely separat-

ed. For example, information want and use are more or less manifestations of the term information need. (Nicholas 2005, p. 19) Therefore, during the assessment of information needs, attention should be paid to all of these information concepts. Nicholas (2005, p. 19) highlights the need to investigate different information concepts by stating that: “..we should be evaluating the needs people have for information, the wants and demands they express for it and the use they make of it”. In this way, a comprehensive and an accurate understanding on the studied matter can be achieved without losing any valuable information during the assessment.

The relation between the concepts of received, wanted and needed information is presented in Figure 4. As one may notice, there are major gaps in between what information is received, what people express as their information wants and the information they actually need to perform the tasks assigned to them.

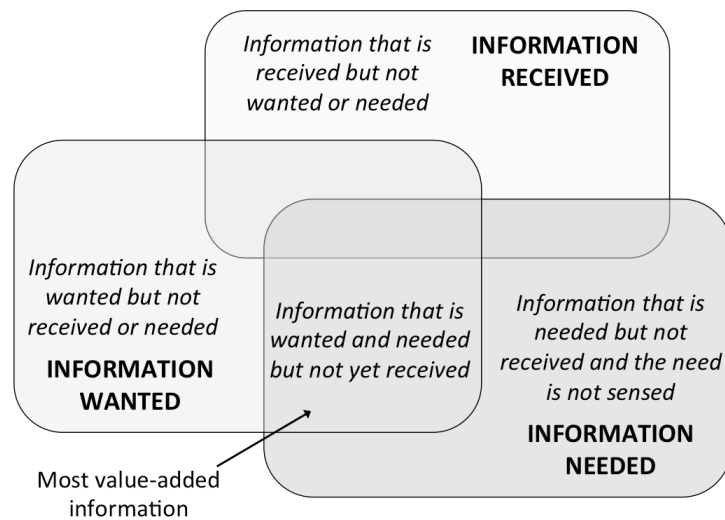


Figure 4: Relationship between information concepts. Adapted from Marti (1974) and Pirttimäki (2007, p. 43).

People value the information that they want (Rouse 2002, p. 282). What this means is that wanted information is more closely connected to personal interests than this information would have a real use for. Therefore, organizations should not waste their valuable resources in fulfilling information wants as there are a great number of information needs that should be addressed. This does not mean that users' information wants should be neglected during the assessment of information needs, as information wants may help in identifying the needs. However, separating information wants from needs may not always be an easy task as assessments are often conducted by information professionals and not the actual users of this information. Besides information wants, information regarding unwanted information can be valuable as well (Choo 2002, p. 28).

In addition to the aforementioned information concepts, the concept of information use is also important but rather complex at the same time. Even though the use of information is enabled by providing a user an access to information, its usefulness is depend-

ent on both the wants and needs users have for this information. Therefore, an organization's information gathering should be focused on the information where users' needs and wants encounter (Pirttimäki 2007, p. 43). This is classified as the most value-added information as it is needed to perform a certain task and wanted by the user at the same time. Information which is both wanted and needed by the user is often accessed and then used (Rouse 2002, p. 282).

On the other hand, if a user does not sense a need for a certain information, this information might not be used, even though this information is at the user's disposal. This type of need is referred to as dormant need (Devadason & Lingam 1997, p. 41). Often users do not become conscious of this type of need until the need is sensed as the users are either unaware of the need or undervalue the information (Pirttimäki 2007, p. 43). Besides the expressed needs which users indicate, there are also unexpressed needs, which users are unwilling to express even though they are aware of these needs (Devadason & Lingam 1997, p. 41).

2.3 Managerial information seeking behavior

All individuals and organizations have information needs, which is one of the reasons why this subject has gained so much attention in the academic world. The spectrum of different types of needs is extremely wide in all organizations. It ranges from individual needs deriving from simple decisions to far more complex strategic decisions made by the top management. (Dorner et al. 2015, p. 2-9, 31).

Generally, managers as well as all other information users are motivated to fulfill their information needs (Wilson 2006, p. 659). Besides searching for answers to their questions, decision-makers seek information that can also lead them to available solutions for their problems (Choo 2002, p. 39). According to Wilson (2006), information seeking behavior initiates when the information user recognizes the need of information. If the need is unrecognized or there is no need for the information, this behavior may not occur at all. (Wilson 2006, p. 659).

In order to support managerial decision-making, it is essential to have an understanding of this behavior as it describes how managers seek and gather information from multiple information sources and how certain information is selected in order to satisfy the need they perceive. Multiple models are developed to describe decision-makers' information seeking behavior. A combined model based on these studies of Wilson (1981) and Leckie et al. (1996) is presented in Figure 5.

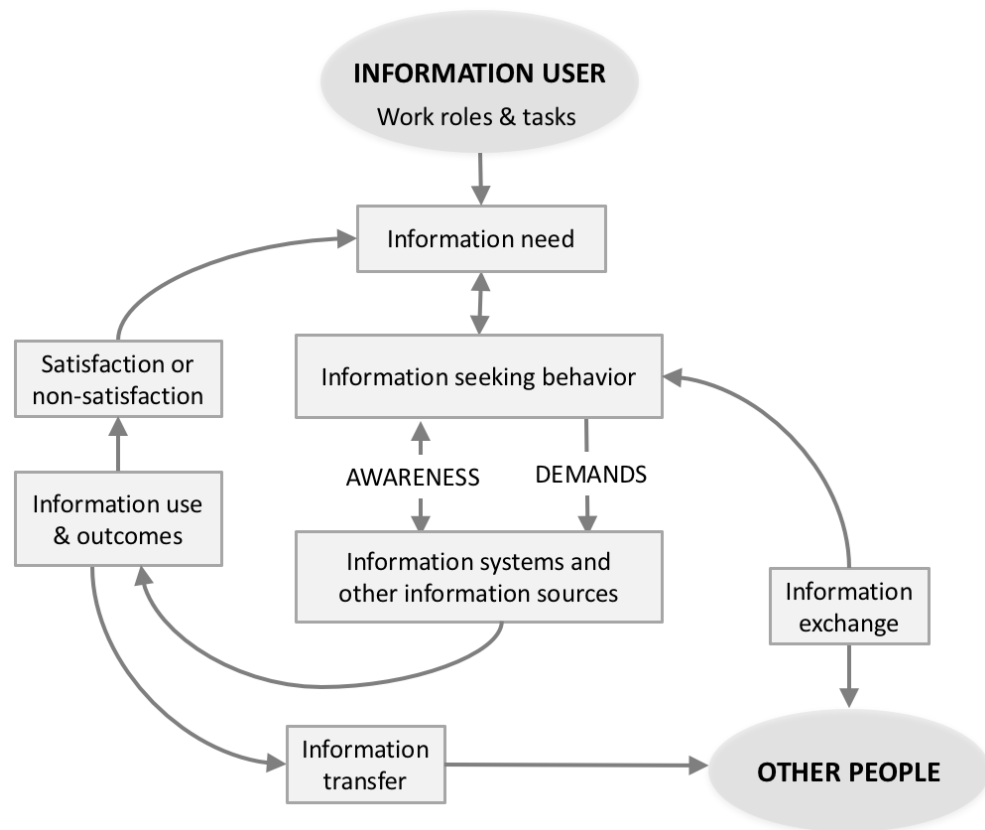


Figure 5: A model of information seeking behavior. Adapted from Wilson (2006, p. 659) and Leckie et al. (1996, p. 180)

Once the information seeking behavior initiates, the information user indicates the demand to the information system or other information sources. Alternatively, the information user may express the demand to other people and in this way initiate an information exchange between these parties. (Wilson 2006, p. 659-660) Once the needed information is received, it can be used, which produces changes to the business environment. Information use is the step in the information seeking behavior where the information need may be satisfied (Nicholas 2005, p. 19). Nevertheless, these needs can never be completely satisfied as new needs emerge continuously. For example, the awareness of available information sources changes how managers perceive the organizational information environment (Leckie et al. 1996).

Leckie et al. (1996) suggest that information needs are primarily dependent on the tasks assigned to the manager, which on the other hand, are dependent on the manager's role and responsibilities in the organization. What this means is that especially managers with a variety of complex tasks are more likely to have wider and more diverse information needs (Laitinen 2008, p. 552). Besides, new information needs arise when decision-makers encounter problems, uncertainties and ambiguities as a part of these tasks (Choo 2002, p. 26).

What is missing from the model of information seeking behavior is the influence of the organizational context. The context is known to affect an information users' information needs in the same way as their roles and tasks in the organization do. Laitinen (2009) even suggests that information needs are mostly determined by the context in which the decisions are made rather than the tasks of managers. The contextual factors affecting the needs are, for example the business environment and technology, size, structure and strategy of the organization. (Laitinen 2009, p. 550) The contextual dependency of information needs is especially significant in the operative managerial level as these needs are closely connected with the context dependent business operations.

It can be said that multiple factors affect managers' information needs. Besides the evolvment and change in the business environment, the development and growth of the organization changes the information needs as well (Sen & Taylor 2007). Information needs are therefore highly time-bound, which means they exist immediately or sometime in the future (Devadason & Lingam 1997, p. 41-42). This also affects the perceived importance of certain information in a certain time period. As future information needs cannot be comprehensively anticipated, information need assessment should be seen more as a current state analysis rather than a way to predict the future needs (Laihonen et al. 2013, p. 25).

2.4 Information need assessment

The term need assessment refers to the process and action of assessing needs, as the name clearly indicates (Soriano 2013). As the term need was earlier defined as a learning or performance gap between the current and desired state, need assessment can be seen as a process aimed to overcome the gap between these two (Sleezer et al. 2014). In other words, need assessment is all about making better decisions and can help in the justification of these decisions as well (Watkins et al. 2012 p. 19, 25).

The terms need analysis, performance analysis and gap analysis are sometimes used as a synonym for the term need assessment, even though they are more precisely tools used when performing these assessments (Watkins et al. 2012, p. 15). Nevertheless, especially the terms need assessment and need analysis are closely related concepts. Need assessment can be utilized to identify and prioritize needs by investigating the gaps in results. Needs analysis, instead, goes a little further by identifying the causes of these needs and determining the requirements for the solutions. (Watkins & Kaufman 1996, p. 12). In this study, the term information need assessment refers to the process and action of identifying and analyzing managerial information needs, which is then used in order to increase an organization's capabilities in satisfying these needs with relevant business information.

Information need assessment studies the needs of a predetermined group of people in a specific context. Usually the formulation of these groups is done based on the occupa-

tion or profession of the members or some other suitable characteristic. This segmentation of users is done because the members of a certain group have broadly similar needs and requirements (Dorner et al. 2015, p. 33-34), which can then be generalized and fulfilled efficiently. Very often the managers of an organization are the focus of these assessments. Assessments can be conducted as a simple study where only a few employees are involved or as a complex and costly study which includes a great number of participants and effort (Brethower & Smalley 1998, p. 8).

Need assessment often focuses in the areas of strategic needs, operational or tactical needs, individual performance needs and learning needs. These are the most common types of need assessments but a wide range of other assessments are performed as well. Very often the assessment of strategic or operational business needs is prioritized compared to other types of assessments. (Sleezer 2014) As information need assessments are conducted for different purposes, the characteristics of these assessments range widely. Brethower & Smalley (1998) remind that it is important that the scope is defined before the collection of information begins. Theories from scientific literature can help in focusing the scope. (Brethower & Smalley 1998, p. 8).

There are several reasons for conducting information need assessments. The usual objective for a private sector organization is to increase its profitability (Sleezer et al. 2014) or the performance of the organization (Watkins et al. 2012, p. 22). Information need assessment helps in targeting the services and actions of the organization by improving the acquisition and utilization of relevant and timely information (Soriano 2013 p.xiv). According to Soriano (2013), the most common reasons for conducting a need assessment are:

- *justification for funding,*
- *regulatory reasons,*
- *aspiration for the best use of limited resources,*
- *requirement to assess the needs of a certain group or*
- *aim to provide information as a part of the program* (Soriano 2013 p. xv).

Besides the general need assessment, this list is valid for information need assessments as well. As one may notice, an assessment may be initiated by internal or external factors but in many cases multiple factors occur at the same time. From the information need assessment point of view, the third and the final bulletins points are especially important as these assessments are often aimed to improve organizational decision-making by utilizing available information resources more efficiently. Despite these differences in the characteristics of information need assessments, the processes and methods are more or less the same in all organizations.

The needs analysis process designed by Gorman & Clayton (2005) is presented in Figure 6. This process model can be used when planning the assessment of information

needs as well as for other types of needs. Usually the stages of information use and the evaluation of results are not included into this process as the need analysis process ends once the information has been gathered, analyzed and reported (Dorner et al 2015, p. 68). In reality, these final stages should not be overlooked as the real value of the assessment is realized only when the reported findings lead to the use of information and actual changes in the organization.

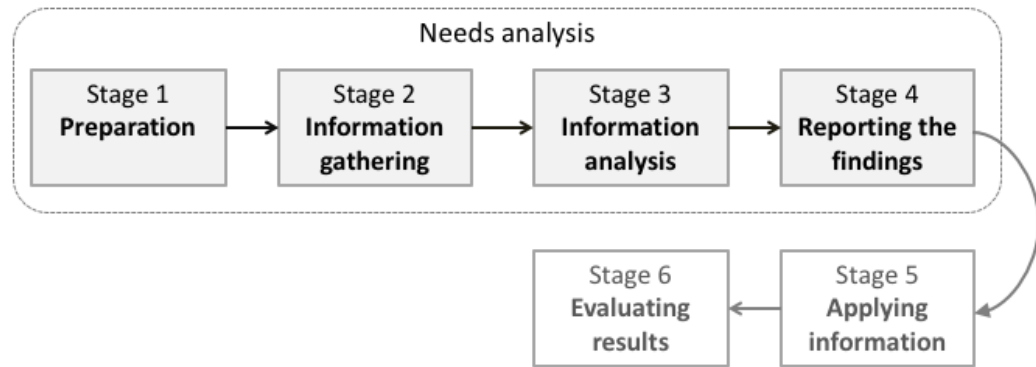


Figure 6: The needs analysis process. Adapted from Gorman & Clayton (2005, p. 35).

Even though this process is straightforward, each of the initial four stages in the process is relatively complex (Dorner et al 2015, p. 80) and technical in nature and can lead to false assumptions if planned or executed incorrectly (Soriano 2013 p. xiii-xiv). Therefore, the assessment should not be based on intuition, which highlights the importance of the preparation stage. A vast amount of work is included into this process as it is built upon the gathering and analyzing of great amount of information, which often requires negotiations and the collaboration of multiple people (Sleezer et al. 2014).

Data collection, which is a central activity in the information need assessment process, requires a great amount of resources but at the same time the achieved benefits are not immediately obvious (Nicholas 2005, p. 10). Therefore, the outcome of the assessment should be made visible in form of action and results. According to Sleezer et al. (2014) possible outcomes of the information need assessment are:

- *improved alignment between resources and strategy,*
- *improved relationship among stakeholders,*
- *clarification of problems and opportunities,*
- *clearer goal setting for future actions,*
- *improved decision-making by providing data, insight or justification* (Sleezer et al. 2014).

Despite the possible outcomes, information need assessment is often neglected. For example, most of today's information systems are designed to fulfill information needs that are either well-known or easily predictable and where the context is understood and the need can be specifically articulated (Dorner et al. 2015, p. 30). This highlights how

deficient resources in information need assessment will affect an organization in the long run. It is also inevitable that people with different roles and expertise are involved when need assessment is conducted (Watkins et al. 2012, p. 247). Besides the attendees of interviews and other data collection activities, the role of an information professional is rather important.

Very often users are incapable of describing or anticipating their current or future information needs (Nicholas 2005, p. 5-10). Expressing information needs to another person is not a simple task as both members need to understand the decision-making context as well as the ways how this information is to be used (Choo 2002, p. 29). When needs are communicated, they suffer from poorly specified goals and include both beliefs, assumptions and leaps in logic (Sleezer et al. 2014). Therefore, the rather simple question “*What information is needed?*” is often more difficult to answer than one would expect.

What makes it even more challenging is that at the same time as managers are incapable of describing their own information needs, information professionals do not possess the required knowledge so that they could provide the needed information to the managers (De Alwis & Higgins 2002). Therefore, attention should be paid to data collection and analysis methods. According to MacMulling & Taylor (1984), by asking the question “*What do you want to know?*” will not bring the needed results. Instead, more extensive questions are needed:

- “*Why do you need to know it?*”
- “*What does your problem look like?*”
- “*What do you know already?*”
- “*What do you anticipate finding?*”
- “*How will this help you?*”
- “*How do you need to know it?*”
- “*In what form do you need to know it?*” (MacMullin & Taylor 1984)

Once the information needs are identified, decision-makers are usually able to define for themselves which information sources are most suitable to fulfill these needs the best (Choo 2002, p. 32).

2.5 Characteristics of information needs

Reporting the findings is usually the final stage of the information need assessment process as described earlier. Information needs that ought to be addressed are gathered into a report, which describes the findings in a timely, understandable and accurate manner (Dorner et al. 2015, p. 79). Besides evaluating the individual information needs, the objective is to provide an overall picture of these needs.

Managerial information needs can be described with a set of general information characteristics (Ashill & Jobber 2001, p. 52). Instead of evaluating information needs based on the different levels of business information, a more detailed set of information characteristics should be included (Hannula & Pirttimäki 2005). These categorizations give depth to the assessment as identified information needs are evaluated from multiple perspectives. Nevertheless, it is important that the selected framework is suitable for the task at hand.

Multiple information need categorizations are introduced in the literature. One of these categorizations is introduced by Hannula & Pirttimäki (2005), which identifies three aspects of information: subject, source and type. These aspects are brought together in a cube of business information presented in Figure 7. Each axis on the cube presents one of these aspects by dividing the subject and source of information into internal and external information and the type of information into qualitative and quantitative information.

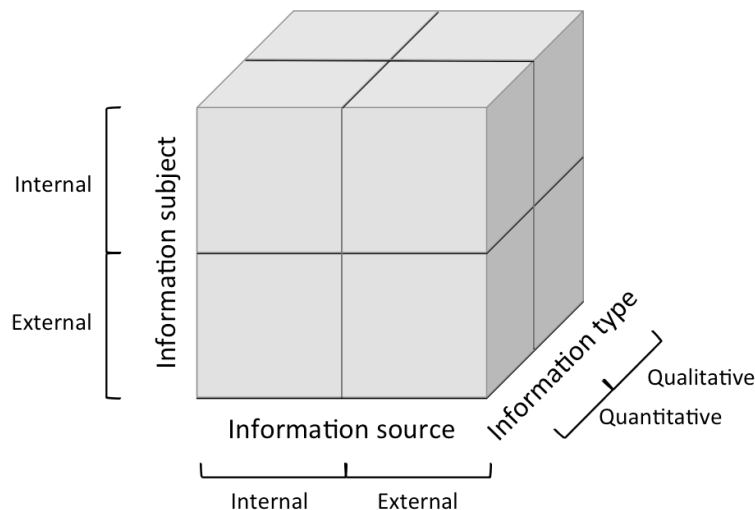


Figure 7: *The cube of business information. Adapted from Hannula & Pirttimäki (2005, p. 38).*

This categorization can be used when assessing managerial business information needs as it highlights the need for information of certain type, subject and source depending on the need it is to satisfy (Hannula & Pirttimäki 2005, p. 34, 37). For example, an organization's production figures used for the planning and execution of business operations can be categorized as internal in terms of the subject and source and be quantitative in term of the information type. On the other hand, information about competitor activity, which is external by its information subject, can be gathered from both internal and external information sources and can be either qualitative or quantitative by its type.

2.6 Summary

The two main themes of this study, business information and information need, were introduced in this chapter. Business information, or the information about a company's business operations and environment, is required to maintain the competitive advantage of the company. This term is often defined by looking at different levels of information including data, information, knowledge, wisdom and truth. In this study, the term information is used as a more general term to include information levels of data, information and knowledge.

The term information need refers to the gap between the current information and the information required to perform a certain task or to make a certain decision. Information needs are therefore dependent on users' roles, tasks and the context among multiple other factors. Information seeking behavior initiates when information users recognize the need for information.

The term information need is often confused with the concepts of information want and use. As wanted information is more closely related to people's personal interests rather than to a real use of information, organizations should not waste their resources on satisfying information wants as there is a great amount of information needs which should be addressed first. Therefore, in order to support managerial decision-making, resources should be focused on providing information where users' needs and wants encounter as this type of information is often used and therefore classified as the most value-added information.

Information need assessment is a process where information needs of a predetermined group of people are assessed. When conducting need assessments, it is important to pay attention to all of the information concepts of need, want and use of information, as these concepts are not completely separated. With the help information need assessments, organizations are able to identify and prioritize needs so that these needs can be satisfied more efficiently with relevant business information. Nowadays, these assessments are a fairly common business activity, and profitability or performance increase is often defined as the objective. A very common challenge in information need assessment is that at the same time as managers are incapable of describing their own needs, information professionals do not possess the required knowledge about these needs so that the needs could be identified.

3. MANAGERIAL DECISION-MAKING AND BUSINESS INTELLIGENCE

This chapter defines the final two of the four main themes of this study: managerial decision-making and business intelligence. At the beginning of this chapter, managerial decision-making supported by business information is studied. After that, the objective, process, and typical architecture of business intelligence are introduced.

3.1 Managerial decision-making

The job description of managerial work is often considered to be ill-defined as the responsibilities and boundaries are flexible and at least partly self defined (Choo 2002, p. 60). Interruptions and encounters with other people as well as the characteristics of great variety, brevity and fragmentation are also included to managerial tasks (Laitinen 2009, p. 551).

Decision-making is an essential task included in most managerial activities (Turban et al. 2011, p. 7) and it is therefore one of the key competencies managers are required to have. Nutt & Wilson (2010, p. 3) even suggest that managerial work is a synonym to decision-making. At the same time, an opposite argument presented by Hall (2010) remarks that even though managers make important decisions, not all decisions are critical and that decision-making is only one of the assigned tasks of managers. Instead, for example the task of problem addressing is a more important part of managerial work. (Hall 2010, p. 301). In this statement, the mindset is clearly transferred from management towards the mentality of leadership where the responsibility of decision-making is divided more equally within the organization. This is true especially in professional services organizations where the vast majority, if not all, employees can be defined to be decision-makers. Despite this, decision-making is still a vital organizational task and at the end of the day, more or less the responsibility of managers.

The business decision-making process by Herbert Simon (1977) models managerial decision-making with steps of intelligence, design, choice and implementation (Figure 8). Additionally, a fifth step of monitoring can be added to the end of the process (Bocij et al. 2003, p. 20). These steps are more or less overlapping and often include iteration before the final decision is made (Chaffey & White 2011, p. 96). Despite the process, very often decisions are made more or less unconsciously and without thinking about the steps (Swami 2013, p. 210). Therefore, it is easy to expect that, for example the phases of design and choice are carried out more or less simultaneously.

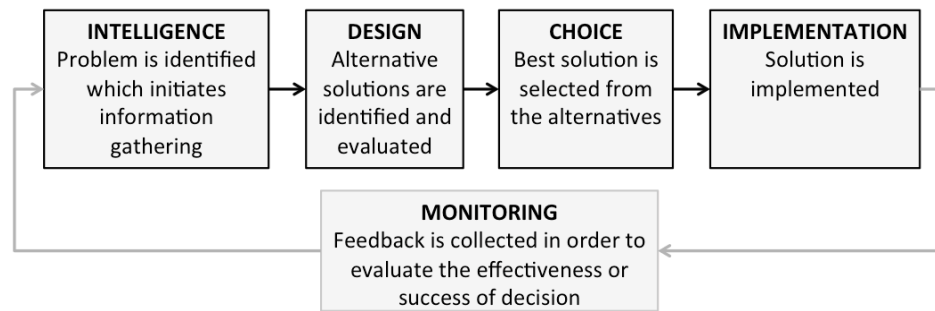


Figure 8: Decision-making process. Adapted from Chaffey & White (2011, p. 96), Turban et al (2011, p. 46) and Bocij et al. (2003, p. 20).

The decision-making process begins with the identification of the problem and by seeking alternative solutions to overcome it. Decision-making can therefore be seen as a selection process where available alternatives are evaluated (Mayer & Quick 2015, p. 17) and among which the best or at least the logical choice is selected in order to attain pursued goals (Turban et al. 2011, p. 41; Swami 2013, p. 204). Nevertheless, decisions are not made in a homogenous way as the decision-making style varies between individuals and also between situations where the decision is made (Turban et al. 2011, p. 42-43). The interpretation of the situation is dependent on the beliefs and the values of the individual in question (Choo 2002, p. 45). Also, a decision-maker balances between the elements of intuition and logic and often favors one over the other (Chaffey & White 2011, p. 96).

In the monitoring phase, the successfulness of the decision is evaluated (Bocij et al. 2003, p. 20), which often requires some time before changes in the business operations and environment can be evaluated. Especially in strategic decisions this time is fairly long which makes learning from mistakes more challenging as well as complicates making of corrective actions. Therefore, the ability to predict possible outcomes of alternative choices is required from a decision-maker (Swami 2013, p. 204).

The complexity of decisions varies greatly between different types of decisions. Decisions can be divided into two main groups based on the characteristics: structured and unstructured (or programmed and nonprogrammed) decisions (Figure 9). (Simon 1977). Managers encounter both of these problem types as a part of daily business operations. Structured decisions predominate especially on the operative organizational level in the same way as decisions in the strategic level are more often unstructured (Bocij et al. 2003, p. 252). Decisions made on the same organizational level have therefore similar characteristics (Bocij et al. 2003, p. 17), which means that the information needed to support these decisions is somewhat similar.

STRUCTURED DECISIONS (PROGRAMMED)		UNSTRUCTURED DECISIONS (NONPROGRAMMED)
Operational	Management level	Strategic
Small	Impact on organization	Large
Short	Time scale	Long
Frequent	Frequency of decisions	Infrequent
Well defined	Problem definition	Ambiguous
Repetitive	Repeatability	Novel
Solvable	Solving with existing procedures	Unsolvable

Figure 9: Decision characteristics. Adapted from Choo (2002, p. 33) and Bocij et al. (2003, p. 19).

Decision support on the operational level is often tied to a specific business activity (Grossman & Rinderle-Ma 2015, p. vii). Even though the impact of individual decisions made on this level is defined to be small, these decisions have a high impact on the performance of the organization. As these decisions are made more frequently, the number of decisions is also higher. As the affecting elements of these structured problems can be identified, these decisions can be supported with relevant information (Thierauf 2001, p. 70-72) and solved with existing procedures. The amount of decisions made is higher in smaller organizations and also on lower managerial levels than in medium or large-sized companies where collaborative decision-making is utilized more often when making major decisions (Turban et al. 2011, p. 43).

Strategic support includes the decisions made by the top management of an organization (Grossman & Rinderle-Ma 2015, p. vii). The need to make intelligent unstructured (nonprogrammed) decisions is highlighted especially in organizations seeking to innovate as novel situations require higher understanding from the decision-maker (Choo 2002, p. 33). Decision-making is therefore affected by the objectives of the organization. When a decision-maker is unable to precisely identify the unstructured problem, higher levels of information, such as knowledge and intelligence, are needed to support these decisions. Despite the available support, human intuition and judgement are also an inevitable part of decision-making. (Thierauf 2001, p. 70-72)

3.2 Business information and managerial decision-making

In order for businesses to survive in today's highly competitive business environment, organizations are forced to improve business operations by improving the accuracy of decision-making. Informed and justifiable decisions are enabled with a solid information basis suitable for the decision-making. Business information is an essential resource for managerial decision-making (Hannula & Pirttimäki 2005, p. 34; Thierauf

2001, p. 8) as mistakes made in decision-making often cause long-term consequences which influence the performance of the organization.

In order to make intelligent business decisions and to ultimately improve the performance of an organization, managers and other decision-makers require an access to correct, comprehensive and consistent information. As the making of intelligent business decisions is enabled with high-quality information, five quality dimensions of information can be identified as particularly important: accuracy, accessibility, relevance, timeliness and completeness. (Turban & Volonino 2010, p. 80, 86)

According to Turban et al. (2011), a so-called trial-and-error approach was previously a commonly used method in managerial decision-making, which relied heavily on the decision-makers experience, intuition, creativity and judgement. The value of informed decision-making has grown as changes in the business environment have affected management and decision-making dramatically. (Turban et al. 2011, p. 7-9). Nowadays, the utility of trial-and-error method is minor but still needed from time to time. Studies conducted by Schoemaker & Russo (1993) revealed that even though intuition based decisions are often quick and easy to make and can produce brilliant results, these decisions are often affected by inconsistency and distortion. Inconsistent decision-making is a result of people applying different decision-making criteria depending on the day or the situation. (Schoemaker & Russo 1993, p. 10-11). In other words, decisions suffer from quality issues. Distortion, on the other hand, is a result of people either underemphasizing or overemphasizing a certain piece of information (Schoemaker & Russo 1993, p. 11). Especially information which supports a decision-maker's previous knowledge, experiences and the current use case is emphasized by the information user.

The identified information needs can be prioritized by comparing the costs associated with the situation where the need is fulfilled and the situation where the need is left unaddressed (Watkins et al. 2012, p. 23). This may not be an easy task as in many cases both the costs and gained benefits are multifaceted. Despite the clear benefits of informed decisions, it is very common that managers are required to make decisions with incomplete information about a situation (Canellas et al. 2014, p. 7; De Alwis & Higgins 2002). Sometimes even the term "management information crisis" is used to describe a situation where the required information is unavailable when making a decision (Daniel 1961). In these situations, managers are required to fill in the information void with a solution which may or may not lead to wanted results (Frankl 2015, p. 2, 9).

According to Line (1974), common barriers to meeting information needs are:

- *shortage of time,*
- *lack of training,*
- *unavailable access to relevant information sources and systems,*
- *and information overload* (Nicholas & Martin 1997, p. 49).

Managers are required to make fast decisions because time is often seen as the most significant commodity as there is only a limited amount available (De Alwis & Higgins 2002). By developing organizational information management activities, managers' valuable time can be used more efficiently. A positive correlation is therefore known to exist between the effectiveness of organizational information management and the success of managerial activities, such as decision-making (Goodman 1993). Another method used is the training of managers.

Information systems and services are used to improve the acquisition, sharing and distribution of information (Huotari & Wilson 2001). Nevertheless, there are great organizational differences on how easily certain information can be captured. These differences are mainly dependent on the information systems of the organization and the integrations between these systems. This is also the reason why organizations are forced to focus their efforts on supporting the acquisition and distribution of information crucial to their operations. (Chaffey & White 2011, p. 164-165) For many organizations, this is a true challenge as organizational information behavior is changing over time. The situation is especially challenging in growing companies where the methods for formal communication and financial control need to be developed since previous management methods are no longer sufficient (Sen & Taylor 2007).

In the same way as positive outcomes may be received with relevant information, irrelevant information may cause confusion and decrease the performance of an organization (De Alwis & Higgins 2002). Information overload is typically described as a situation where too much information is received and an organization's information processing capabilities are exceeded (Sutcliffe & Weick 2008, p. 3). However, despite the typical assumptions, information overload is not necessarily about the amount of information. Instead, it should be seen as the manager's capability in making sense or the ability to interpret information, which varies greatly between individuals. (Sutcliffe & Weick 2008, p. 7) Therefore the risk of information overload can be reduced by managing the quality of information in a way that this information better fits its purpose and is more relevant to the users (Chaffey & White 2011, p. 9). If information gathering is done based on availability and not by its quality or usefulness, there is a great chance that the information can harm the organization (Laihonen et al. 2013 p. 44). This may lead to a situation where important organizational functions, such as decision-making, are in danger of getting compromised (Vuori 2006, p. 311).

3.3 Business Intelligence (BI)

Business intelligence (BI) means different things to different people and there are multiple definitions available. This umbrella term combines various aspects together (Sharda et al. 2014, p. 32) including the processes, techniques and tools used to support decision-making (Hannula & Pirttimäki 2005, p. 34). By improving managerial decision-

making on both operative and strategic level, an organization is able to gain competitive advantage (Vuori 2006, p. 311).

Possible benefits of BI were identified in the study conducted by Nigel Pendse in 2003, which utilized a comprehensive survey of 3000 employees in 48 countries (Table 1) (Thompson 2004). As one may notice from the results presented, improvements in reporting and decision-making are seen as the most important benefits, and as Turban et al. (2011, p. 22) highlight, the benefits are mostly intangible.

Table 1: *The benefits of business intelligence. Adapted from Thompson (2004).*

Benefit	Companies realizing benefit
Faster and more accurate reporting	81%
Improved decision-making	78%
Improved customer service	56%
Increased revenue	49%
Savings in non-IT costs	50%
Savings in IT costs	40%

Organizations seldom struggle with the lack of information, but the lack of needed information is a very common issue in many organizations. “*The right information needs to be in the right place at the right time and in the right format*” (Choo 2002, p. 42) is therefore a commonly used phrase when talking about the objectives of business intelligence. Information gap is a gap between gathered information and the decision-maker’s information needs (Pirttimäki 2007, p. 42) which describes the state of the organizational information management. This gap, which is between the demand and supply of information, can be defined by first identifying an individual manager’s demand for information (Laitinen 2008, p. 553) and then comparing these needs with the current information offering. In order to reduce this gap, organizational BI activities should be better targeted to meet these needs. Despite the fact that managerial decision-making relies heavily on the information at managers’ disposal (Vuori 2006, p. 311), moving from intuition into informed decision-making is not an easy task. In order for BI capabilities and processes to support business operations and decision-making, a certain type of organizational culture and support from top management is needed (Watson & Wixom 2007, p. 98).

Business intelligence applicability or its importance as a competitive advantage is not tied to the size of a company. It can be leveraged in companies of all sizes to further the organization’s objectives, goals and strategy. (Thierauf 2001, p. 16) Even though this activity is not always systematic or even conscious, all organizations are practicing business intelligence at some level (Laihonen et al. 2013, p. 46). Business intelligence activity also changes over time as a result of the evolvement of organizational needs and maturity.

According to the study conducted by Tyrväinen et al (2013), business intelligence operations have significantly increased their importance in recent years among the top 500 Finnish private sector companies. Nowadays, BI has proliferated its place in these organizations and its importance is also estimated to grow in the future as it has not yet seen to reach the required level. (Tyrväinen et al. 2013, p. 38-39). One of the explanatory factors for this increased interest in BI is the change in the business environment and market towards a more international in scope (Hannula & Pirttimäki 2005, p. 35) which brings out new types of requirements for organizations. This change is also affecting SMEs and therefore the increased interest towards BI activities is expected to increase.

3.4 BI process

Even though the objective of BI is often specific to an organization, the methods used are more or less the same in all organizations. The business intelligence process developed by Laihonen et al. (2013) is presented in Figure 10. As a part of this process, business information meaningful to the business operations is gathered from multiple information sources, processed, analyzed, distributed and used. (Laihonen et al. 2013, p. 45-46) The main purpose of BI process is to make sure that business information is used efficiently (Hannula & Pirttimäki 2005, p. 34) and therefore this process is all about the transformation of data into a more useable form (Daconta 2007). During this process, data is first transformed into information, then to informed decisions and finally to actions based on these decisions (Turban et al. 2011, p. 19; Sharda et al. 2014, p. 33). Once the information is received and used by the decision-maker, it can be referred to as business intelligence (Thierauf 2001, p. 4).

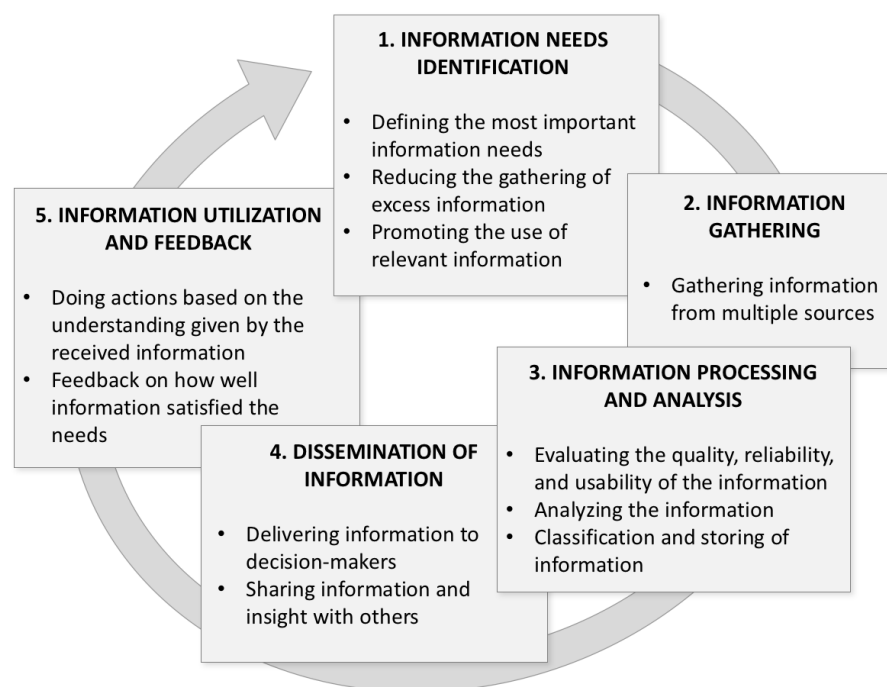


Figure 10: BI process model and key tasks. Adapted from Laihonen et al. (2013, p. 46).

The BI process begins with the identification of information needs, which is also the most important phase of the process as it guides the acquisition of information and therefore affects the whole BI process (Laihonen et al. 2013, p. 25). The three objectives for this phase are:

- to define the most important information needs,
- to reduce the gathering, analysis and distribution of needless information, and
- to promote the use of relevant information (Laihonen et al. 2013, p. 46).

The main objective of this phase is to recognize what information is needed, when and in which format. As information needs are in constant change due to changes in the environment and business operations, information needs are identified and complemented throughout the process. (Laihonen et al. 2013, p. 47). Besides identifying the most important information needs, all organizations should reduce the gathering of excess information to make sure that organizational resources are used efficiently. Promoting relevant business information is included in the process as the awareness of the information resources is known to increase its use.

In the second phase of the process, information is gathered from multiple information sources based on the identified information needs. Information sources inside and outside the organization are utilized at this point (Vuori 2005, p. 311). Usually a great proportion of an organization's information is formed as part of the transactions in daily business operations and therefore it mostly concerns the internal resources and operations of the organization (Choo 2002, p. 29). For this reason, most of the information processed in BI process is typically internal. Nevertheless, the focus of information acquisition and processing is turning more and more on the organization's external environment which increases the variety and amount of information. Information, which is not relevant to decision-makers, should not be gathered or analyzed, as organizations cannot afford to waste valuable resources, time (Choo 2002, p. 26) and money to process information, which is incapable of supporting the decision-making (Devadason & Lingam 1997, p. 41).

Formal and controlled information acquisition is only one aspect as members of an organization often gather information by using informal routes as well (Huotari & Wilson 2001). Obviously, a managers' primary information source is their own knowledge which they already possess (Rouse 2002, p. 283) and which they complement with information received from other sources. Formal information sources are more often leveraged when making decisions that affect the organization in the long term (Laitinen 2009, p. 552). It is also very common that managers satisfy their day-to-day information needs with information acquired using informal information sources such as meetings, phone calls and informal reports (Laitinen 2009, p. 552). These informal information sources are used in spite of the available formal information sources (Hall 2010, p. 302) which is very important to understand when designing formal BI processes.

During the third and fourth phase of the process, information is first refined into information products, such as monthly reports, which are then delivered to the decision-makers. (Laihonen et al. 2013, p. 47-48) This requires the capabilities to combine, process and analyze information gathered from multiple sources. Information acquired from multiple sources is disseminated and shared among the members of an organization by making use of information distribution processes (Choo 2002, p. 42). The distribution and acquisition of information often exceeds organizational boundaries and information systems have an important role in this process. Besides information systems, information products are also often utilized for delivering information to decision-makers and other information consumers. Organizations need to pay close attention to the distribution of information as the value of information is measured through the consumption of information and not by its production (Daconta 2007).

The final step of the BI process is the utilization of information, which accomplishes changes in business operations. As mentioned earlier, there is a clear difference in the use of information between situations when there is and is not a need for certain information. Devadason & Lingam (1997, p. 42) claim that when information is provided based on a need, it will be used. In a contrary situation, where information is provided to a user based on an interest and not the actual need, there is a great chance that the provided information will not be used. (Devadason & Lingam 1997, p. 42) Besides evaluating the utilization of information, it is important that feedback from the information users is collected to find out how well information needs are satisfied so that corrective actions can be made.

3.5 BI architecture

In order for business intelligence to be successful, it must be beneficial to the enterprise as a whole. People from different interest groups must be involved, so that needs and viewpoints of various BI user groups will be noticed when designing the system. (Sharda 2014, p. 40) Even though the basic principles for BI are more or less the same in all organizations, BI architecture is always organization-specific. According to Watson (2009), BI architecture is dependent on organizational targets. Three basic types of targets for BI can be identified: to support very focused needs at the department level by using independent data marts, to support current and future organizational BI needs with the help of data warehousing, or to support organizational transformation by enabling the implementation of new business models and strategy. (Watson 2009, p. 491-492).

Traditional business intelligence architecture is described in Figure 11, which includes the layers of data, analytics and presentation. The BI process can be simplified into the stages of getting the data into a data warehouse for analysis and getting the data out of the data warehouse for decision-making (Watson & Wixom 2007, p. 96). Structured data is transferred from multiple internal and external source systems and stored into data marts and data warehouses. This transfer is done based on the analysis require-

ments of the organization (Chaffey & White 2011, p. 399) and combined on the analytics layer. Finally, on the presentation layer, the information is often provided to the users by utilizing a BI software.

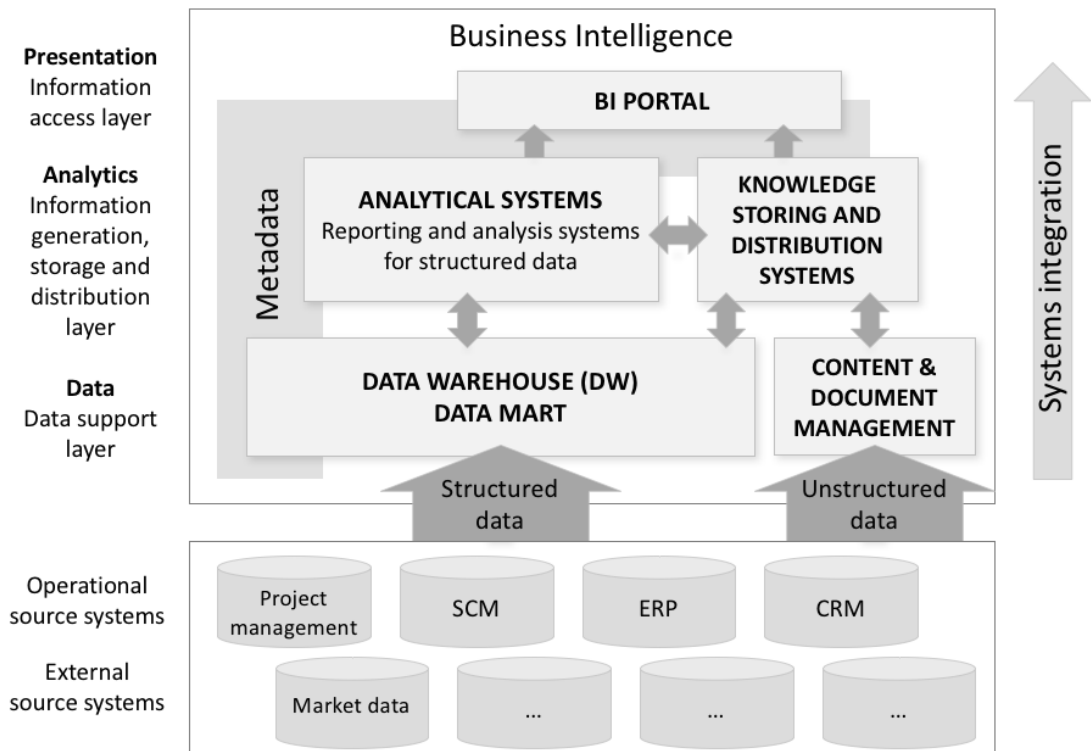


Figure 11. High-level architecture for BI. Adapted from Rausch et al. (2013, p. 5, 23).

The data warehouse is often classified as the heart of the business intelligence system. This special type of database is planned especially for analytics purposes and to enable the aggregation of data from multiple transaction databases (Turban & Volonino 2010, p. 80), for example project management and ERP system. A DW is implemented to overcome the challenges in organizations' current information systems, which are often designed to process business transactions, but seldom to satisfy analytical requirements. Therefore, the main requirements for a DW are extensability, data synchronization and time dimension based data analysis (Bose 2006, p. 45).

Usually architecture where data is loaded directly from source systems to the DW is the best in the long term even though it is more difficult to build and manage and is therefore relatively costly (Bose 2006, p. 46-47). The challenge in BI investments for many organizations is that input and output are unevenly divided, as the initial phase requires about 80 percent of the time and effort and delivers very limited value to the organization (Watson & Wixom 2007, p. 96). Therefore, data marts, which are basically a smaller version of a data warehouse and designed for the use of a limited group of people, can be utilized. Many organizations begin their BI activities by loading data from the source systems into data marts because in this way the return for the investment is gained faster and a DW may be implemented at a later stage. (Bose 2006, p. 46-47).

A great amount of organizational information is in an unstructured format. According to Rausch (2013), conventional databases and BI applications are often incapable in processing unstructured data and therefore this type of information does not support decision-making. Nowadays, besides operating on transaction based structured data, comprehensive BI frameworks also have the capabilities for handling unstructured information. (Rausch et al. 2013, p. 19, 265-267).

BI software has become mainstream and it is nowadays either used or planned to be taken into use in the coming years in most medium and large-sized companies (Grossman & Rinderle-Ma 2015, p. v). Analytics is an important part of BI and it is used for multiple purposes and perspectives. It is very common that at the early stages of business intelligence maturity, usage is more often focused on the analysis of historical data and has a lower impact to the organization (Watson & Wixom 2007, p. 96). Historical data based descriptive analytics provide reports describing what has happened in the past (Sharda 2014, p. 30), which is valuable information to the management as it enables the comparing of the organizations results with its targets. According to Thierauf (2001, p. 22), the fundamental purpose of BI systems is to measure historical activity but over time the focus has expanded to include information that takes business intelligence towards a future orientation. To be future orientated also means a wider scope and new requirements (Watson & Wixom 2007, p. 96). At this point, predictive and prescriptive analytics are introduced as there is a need to include forecasts of what might happen in the future. These types of analytics do not get as much attention on the operative level, as they do on the tactical and strategic level (Mayer & Quick 2015, p. 17-18).

3.6 Summary

The final two of the four main themes of this study, managerial decision-making and business intelligence, were introduced in this chapter. Decision-making is an essential task included in most managerial activities. Decisions can be divided into structured and unstructured decisions, based on the characteristics of these decisions. Managers encounter both types of decisions as a part of their daily business activities but especially structured decisions predominate the operative organization level.

Despite the different types of decisions, it is important that an organization supports both types of decisions with relevant business information and in this way improves the accuracy of decision-making. Nevertheless, very often managers are required to make decisions with incomplete information, which can be described with the term of "management information crisis". Especially shortage of time, lack of training, unavailable access to information and information overload are seen as common barriers in meeting managerial information needs.

Business intelligence includes the processes, techniques and tools which are used to support decision-making by making sure that the right information is in the right place

at the right time and in the right format. Business intelligence applicability or importance is not tied to the size of the company, as all companies are leveraging BI even though this activity might not always be conducted systematically or even consciously. In recent years, BI has significantly increased its importance and proliferated its place in organizations. The business intelligence process includes the five steps of information needs identification, information gathering, information processing and analysis, dissemination of information and information utilization and feedback. This process begins with the identification of information needs which is the most important phase as it guides the whole BI process. Even though the basic principles for BI are often similar in all organizations, BI architecture is always organization specific.

4. BUSINESS PERFORMANCE MANAGEMENT

Business performance management, which is the overall viewpoint of the study, is studied in Chapter 4. At first, the concept of business performance management is examined. Then the relationship between business performance management and business intelligence is defined, including the introduction of a performance management maturity model. After that, three performance management and measurement frameworks are introduced. Finally, based on these frameworks, a new business performance management framework for the use of SME operating in the service business sector is formed.

4.1 Introduction to Business Performance Management (BPM)

Managers are responsible for making sure that the business is performing well. It is not an easy task as multiple variables influence this complex phenomenon (Kroll 2016, p. 9). Performance is a measure which describes how well an organization reaches its goals (Lönnqvist 2004, p. 27). This is a central measure for all organizations, even though factors affecting it are at least partly organization specific.

Performance management and especially the aspects of control and the measurement of performance have become a very popular activity in the last two decades (Grossman & Rinderle-Ma 2015, p. 150; Chaffey & White 2011, p. 490). The popularity of performance management is easy to understand due to its important role in managing the process of strategy execution, which is about translating an organization's plans into results (Cokins 2004, p. 1). In other words, performance management is about *"defining, controlling and managing both the achievement of outcomes or ends as well as the means used to achieve these results at a societal and organisational, rather than individual level"* (Broadbent & Laughlin 2009 p. 283).

Multiple related terms occur in performance management literature. This includes the synonymous terms Corporate Performance Management (CPM), Enterprise Performance Management (EPM) and Business Performance Management (BPM) (Golfarelli et al. 2004, p.2 and Bose 2006, p. 50), which are all subsets of the overall term Performance Management (PM). The use of these terms is usually dependent on the context, as the terms CPM and EPM are more commonly used in the private sector and the term BPM is used both in the public and private sector. (Rausch et al. 2013, p. 7) The term used in this study will be business performance management.

Performance can be reviewed on multiple levels. According to Watkins et al. (2012, p. 23-25) these levels are individual or team level, organizational level and societal level.

Performance reviews on the lowest level are either focused on the accomplishments of individuals or the results of a certain working group or a team of an organization. Organizational performance is highly dependent on the individual and team level performance and therefore cannot be separated from it. Organizational performance is formulated by comparing results to the short and long-term objectives where the most beneficial results are achieved by reaching the objectives. Societal performance refers to the performance of local communities all the way to the performance of the global society and is therefore the highest level of performance. Societal performance is linked to the organizational level and individual or team level performance, even though the linkage is not always direct or observable. All decisions made by individuals affect the overall performance of an organization as well as the performance of a society. Improvement in performance is mostly valued when the alignment between the results on different levels is achieved. (Watkins et al. 2012, p. 23-25)

As improving the performance of an organization always adds costs and only from time to time brings the desired value increase to the organizations performance (Brethower & Smalley 1998), managers are required to evaluate situations one by one. Watkins et al. (2012, p. 24) remind that for this reason not all performance issues are worth improving. Instead, organizations should recognize the results worth improving, the results worth maintaining and the results which should be reduced or even eliminated. (Watkins et al. 2012, p. 24)

4.2 Performance management and measurement

Performance management is a holistic (Ballard et al. 2005, p. 3) and systematic approach which aims to improve the performance of an organization in order to better achieve its strategic targets. The systems and processes that help managers to monitor their organizations' performance against their targets, and also to improve performance by identifying possible sources of problems, are called performance management systems (Chaffey & White 2011, p. 490). For organizations operating in service business, there are three factors which determine the nature of this system: competitive environment, organization's strategy and the services provided (Fitzgerald et al. 1991, p. 115).

The performance management process includes the steps of planning, measurement, analysis and implementation of performance information (Kroll 2016, p. 8, 10-11). During this process, all levels of information are taken into consideration (Aho 2011, p. 21). PM is therefore all about utilizing performance information as a means to improve decision-making and ultimately the performance of the organization. Despite this, traditionally the focus of performance management has been on the measurement of performance rather than on the use of gathered information even though it is imperative for better-informed and more accurate decision-making. (Kroll 2016, p. 8, 10-11) Nevertheless, performance measurement is an inevitable part of this system.

A performance measurement may be put into practice by utilizing individual performance measures or by combining multiple of these measures into a performance measurement system (Lönnqvist 2004, p. 30). However, it is not recommended to isolate and interpret individual measures separately as they are often interdependent (Evans & Richardson 2009, p. 16). In a holistic performance measurement, dozens of qualitative and quantitative measures are tracked and processed and often displayed in the form of dashboards (Wilkes et al. 2011, p. 22). In order to support managerial decision-making, the amount of performance measures needs to be in balance as a great amount of measures may compromise managers' focus and too few measures might not provide the required information to satisfy their needs (Evans & Richardson 2009, p. 16).

When measuring the performance of an organization, both financial and non-financial as well as qualitative and quantitative measures should be included (Fitzgerald et al. 1991, p. 6). Even though qualitative measures are more effective in assessing the overall performance (Evans & Richardson 2009, p. 16), performance management has traditionally concentrated more on the financial performance by measuring revenues, key costs and profits (Wilkes et al. 2011, p. 22). This historically oriented financial measurement is very common even though the information required to meet managerial information needs is mostly related to planning and forecasting (Jääskeläinen & Luukkanen 2014, p. 240). The main reason is that these hard measures are more easily quantifiable and measurable compared to soft measures such as customer satisfaction, which are especially important in the service business due to the intangible nature of services (Fitzgerald et al. 1991, p. 6).

Performance information is therefore a valuable resource in developing the organization's performance. This information is especially important for employees in managerial positions as it enables managers to perceive activities in the work environment which would not be visible to them otherwise (Hall 2010, p. 303). Chaffey & White (2011, p. 7) outline the capabilities of this type of information on both individual and organizational levels. As timely performance information can provide improved support for decision-making on the individual level, this information on the organizational level can be leveraged for developing the quality and profitability of delivered products and services. (Chaffey & White 2011, p. 7)

The amount and utilization of this type of information in organizations has increased enormously in the past two decades (Pollitt 2006, p. 39) even though there are differences between organizations. According to the study conducted by Jääskeläinen & Luukkanen (2014), especially managerial decisions related to resourcing were rarely supported with performance information. In general, performance information was less valued among the middle management and experts than the top management. This indicates that even though organizations collect a great amount of quantitative performance information, in particular, only a part of the potential value of this information is reached due to inefficient use. (Jääskeläinen & Luukkanen 2014, p. 240, 245-246)

4.3 BPM and BI

Business performance management and business intelligence are two closely related concepts and at least partially overlapping (Rausch et al. 2013, p. 6; Grossman & Rinderle-Ma 2015, p. 150) but their relationship is not always clear as there are multiple definitions. According to Ballard et al. (2005), the concepts of BPM and BI are more or less the same. BPM is enabled with business intelligence but at the same time, only a subset of the information BI system delivers is in the focus of BPM. (Ballard et al. 2005, p. 2) Another definition of BPM presented by Golfarelli et al. (2004) refers to it as the second era of BI as it combines new capabilities with traditional BI elements such as data warehousing. These capabilities enable decision-makers on operational and tactical levels to make correct decisions as the monitoring of time-critical operational processes are included. (Golfarelli et al. 2004, p. 1-2) Together these concepts form a combination where data is connected with strategy supporting decision-making (Aho 2011, p. 106-107).

One way to define these two concepts is to compare their most representative characteristics (Table 2). Even though this categorization of traditional BI and BPM enabled by BI are highly generalized, it gives an overall understanding of the basic differences between these two. Instead of defining BPM and BI as two separate concepts, BPM can be seen as the new era of BI, as Golfarelli et al. (2004) suggest. In other words, these two can be seen as different stages of BI maturity where traditional BI is on a lower level than the BI which is used for BPM.

Table 2: *Traditional and BPM enabled BI. Adapted from Ballard et al. (2005, p. 28-29).*

Category	Traditional BI	BI for BPM
Implementation	Departmental	Enterprise-wide
Focus	Historical	Timely, right-time, or real-time
Decisions	Strategic and tactical	Strategic, tactical, and operational
Users	Business analysts	Everyone
Orientation	Reactive	Proactive
Output	Analyses	Recommendations and actions
Process	Open-ended	Closed-loop
Measures	Metrics	KPIs and actionable metrics
Views	Generic	Personalized
Visuals	Tables, charts, and reports	Dashboard and scorecard
Collaboration	Informal	Built-in
Interaction	Pull (ad hoc queries)	Push (events and alerts)
Analysis	Trends	Exceptions
Data	Structured	Structured and unstructured

Compared to traditional BI, this BPM aimed BI supports the work of managers on the operative managerial level among other decision-makers. Instead of analyzing historical data, the focus is mostly on timely, sometimes even real-time, performance information which is gathered and analyzed based on needs. Besides structured data, also unstructured data can be included, which creates new requirements for the BI systems but at the same time is capable of supporting a wider range of managerial information needs. In other words, BPM based business intelligence is a more timely and proactive approach and supports a wider range of users on all organizational levels (Ballard et al. 2005, p. 28). In this study, the term BPM refers to the part of BI operations which is focused on managing the performance of the organization. Despite its internal focus, data gathered from external data sources are in an important role as well.

4.4 BPM maturity model

Developing BI without a clear understanding of the current state or the next steps in the BI roadmap is very difficult (Williams & Williams 2007, p. 41). For this reason, its development is often supported with maturity models as these models improve the transparency of the change. By assessing the BI maturity organizations can increase their understanding of the current state of their BI operations and also define the next steps on the BI development roadmap. With the help of BI maturity model the requirements for the development can be better recognized and prioritized. It also helps in the target setting as well as improves the transparency of the change once the changes are made.

The maturity model developed by Aho (2011) is presented in Figure 12, which introduces the typical characteristics for each of the five maturity levels. Moving onto a higher maturity level means that the organization is performing more efficiently and its business operations are more controlled and foreseeable. On the other hand, companies on the lower maturity levels are more affected by variation as processes are more unstable. (Aho 2011, p. 65) What makes this model meaningful from the viewpoint of this study is that it is developed especially for performance management, which is more or less the same thing as BI as mentioned earlier. Therefore, this maturity model can be used when assessing the BI maturity.

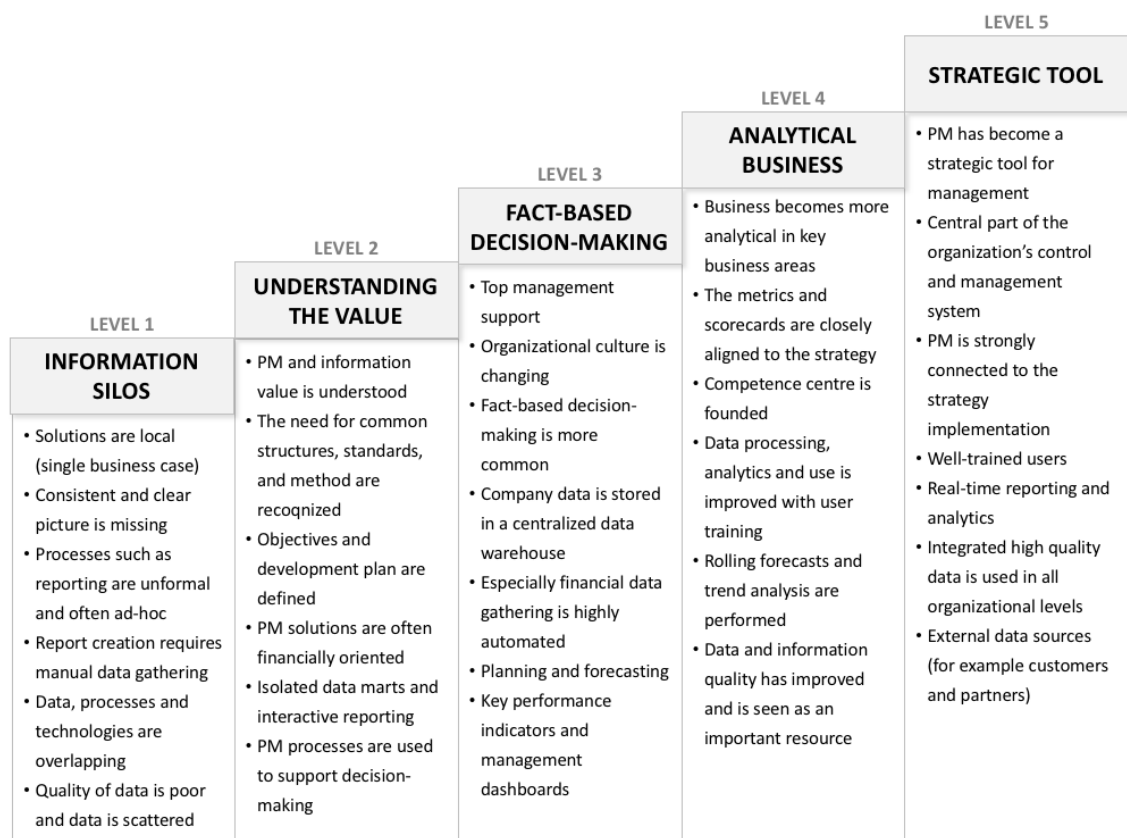


Figure 12: Five maturity levels of BPM. Adapted from Aho (2011, p. 140, 191-221).

The usefulness of maturity models relies on their capabilities to highlight the areas which require further attention and development and which might go unnoticed otherwise. Moving onto the next maturity level is timely when the requirements for the level are achieved. In this way, the requirements of the previous levels work as a foundation for the next level. In terms of time, moving from one level to the next one may require something between few months to multiple years. (Aho 2011, p. 191, 255) As the above mentioned characteristics of different maturity levels show, a great number of organization specific factors, such as organizational culture influence to this process. Therefore, defining the maturity level requires a profound and overall understanding of the organization.

When utilizing Aho's maturity model, the organizations' maturity level is determined by answering altogether 284 statements (Aho 2011, p. 225) which is a commonly used method in maturity models. Nevertheless, the amount of statements represents how time-consuming these models often are to utilize. In this evaluation, maturity is reviewed with the help of five main components and four supporting components of PM (Figure 13). Together, these components comprise all relevant aspects of performance management (Aho 2011, p. 253).



Figure 13: The main and supporting components of BPM. Adapted from Aho (2011, p. 138).

When conducting these types of assessments, it is important that the difference between the terms maturity and capability are understood. Maturity refers to the stage organization has reached in its development path from a certain initial stage into the target stage. Capability, on the other hand, refers to the level of operations which an organization is actually capable of doing. (Aho 2011, p. 65) Therefore, an organization's capabilities are often higher than its actual maturity level suggests. At the same time, an organization's capabilities can be seen as an upper limit for its business operations as its maturity can only be as high as its capabilities.

4.5 BPM frameworks

A great number of business performance management and measurement frameworks have been introduced in the literature. These frameworks are created with the aim to improve the control and profitability of an organization and have received so much attention in the past that they can be considered to become a management trend (Chaffey & White 2011, p. 490). When these frameworks are taken into use, an organization defines the relevant performance measures for each of the performance perspectives acknowledged in the framework. Many of these frameworks are general in nature whereas in some of them the context dependency is more prominent. The frameworks also have differences in how holistically tangible and intangible aspects of performance are taken into account.

The PM literature concentrates on addressing the performance measures that should be included into the performance measurement system but seldom identifies the actual information needs that are to be satisfied with the information collected with them. Despite their performance measurement centric approach, BPM frameworks are also relevant from the performance information need assessment point of view. As performance measures are constructed to satisfy information needs of the organization, these frameworks can also be utilized to guide the identification of information needs. Brethower & Smalley (1998) also suggest that past findings and theories published in the literature are a good starting point when planning a need assessment (Brethower & Smalley 1998, p. 7). Therefore, existing performance management and measurement frameworks were evaluated as a part of the literary review. For this study, multiple frameworks were identified and three most suitable ones were selected for in-depth evaluation.

The first one of these performance management frameworks is developed by Fitzgerald et al. (1991, p. 6-8) and it is created especially for performance measurement systems development purposes. This framework classifies performance into six generic performance dimensions which are competitiveness, financial performance, quality of service, flexibility, resource utilization and innovation. These performance dimensions are then divided into two categories: ends or results and means or determinants (Figure 14). As the performance dimensions in the first category describe the results of an organization's strategy and competitive success, the dimensions in the latter category determine the means of how these results are achieved. Also, this framework identifies the typical measures for each performance dimension, even though these measures vary between organizations. Besides individual measures and dimensions, one should notice that there are dependencies between the different aspects of performance, for example between resource utilization and quality of service. (Fitzgerald et al. 1991, p. 6-8, 17, 115)

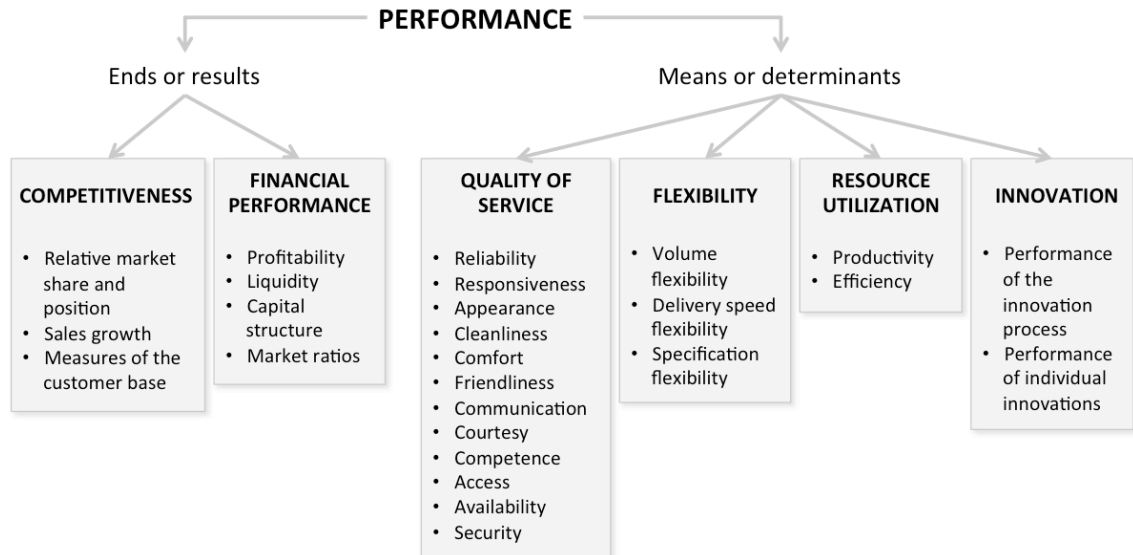


Figure 14. Performance dimensions and types of measures. Adapted from Fitzgerald et al. (1991, p. 8).

Fitzgerald's framework is developed especially for the use of private sector organizations operating in the service business context and is therefore interesting from the viewpoint of this study. Especially aspects of service production and service delivery are highlighted in this framework as seen from the dimensions included in the means or determinants category. On the other hand, this framework does not adequately cover all aspects of performance since important dimensions, such as human resources and customers, are missing (Hudson et al. 2001, p. 1104). From the business performance management point of view, it is critical that all performance dimensions defined as critical to the operations of the organization are covered. Therefore, the context dependency of the framework should be taken into account when selecting the framework. In addition to the context, also the size of the organization affects the significance of performance dimensions.

The second performance measurement framework introduced by Hudson et al. (2001, p. 1097-1105) is developed especially for the use of SMEs and to enable the holistic consideration of performance. What makes this framework unique is that it is designed to align performance measures with the organization's strategy and to transform performance measurement from the traditional financially driven and historically oriented to a more holistic approach. As noticed in Figure 15, this framework identifies critical dimensions of performance, which are quality, time, flexibility, finance, customer satisfaction, and human resources. These dimensions of performance are synthesized based on the literature findings of previous PM development researches. (Hudson et al. 2001, p. 1097-1105)

PERFORMANCE					
QUALITY	TIME	FLEXIBILITY	FINANCE	CUSTOMER SATISFACTION	HUMAN RESOURCES
<ul style="list-style-type: none"> • Product performance • Delivery reliability • Waste • Dependability • Innovation 	<ul style="list-style-type: none"> • Lead time • Delivery reliability • Process throughput time • Process time • Productivity • Cycle time • Delivery speed • Labour efficiency • Resource utilisation 	<ul style="list-style-type: none"> • Manufacturing effectiveness • Resource utilisation • Volume flexibility • New product introduction • Computer systems • Future growth • Product innovation 	<ul style="list-style-type: none"> • Cash flow • Market share • Overhead cost reduction • Inventory performance • Cost control • Sales • Profitability • Efficiency • Product cost reduction 	<ul style="list-style-type: none"> • Market share • Service • Image • Integration with customers • Competitiveness • Innovation • Delivery reliability 	<ul style="list-style-type: none"> • Employee relationships • Employee involvement • Workforce • Employee skills • Learning • Labour efficiency • Quality of work life • Resource utilisation • Productivity

Figure 15. Critical dimensions of performance. Adapted from Hudson et al. (2001, p. 1102).

Compared to Fitzgerald's framework, Hudson's framework approaches performance management from the manufacturing business perspective, which is not ideal from the viewpoint of this study. On the other hand, what makes this framework relevant is that it is designed to take into account the distinct characteristics of SMEs and to cover aspects of performance in a holistic manner (Hudson et al. 2001, p. 1196, 1101). It therefore compliments Fitzgerald's framework with the missing performance perspectives of customer satisfaction and human resources, which are especially important in the service business context.

The most popular PM framework is probably the Balanced Scorecard (BSC) from Kaplan and Norton (Wilkes et al. 2011, p. 25). In its original format this performance management and measurement framework contains four perspectives, which are financial, customer, internal process and learning and growth (or innovation and learning) (Parmenter 2015 and Kaplan & Norton 2005, p. 174). However, it is often complemented with additional perspectives. Parmenter (2015) introduced a modified version of the BSC framework where two additional perspectives of performance are included: environment and community and staff satisfaction. This third framework presented in this chapter is illustrated in Figure 16.

PERFORMANCE					
ENVIRONMENT AND COMMUNITY	FINANCIAL RESULTS	CUSTOMER FOCUS	INTERNAL PROCESS	INNOVATION AND LEARNING	STAFF SATISFACTION
<ul style="list-style-type: none"> • Employer of first choice • Linking with future employees • Community leadership • Collaboration 	<ul style="list-style-type: none"> • Sales growth • Asset utilization • Risk management • Optimization of working capital • Cost reduction 	<ul style="list-style-type: none"> • Increase customer satisfaction • Targeting customers who generate the most profit • Getting close to noncustomers 	<ul style="list-style-type: none"> • Delivery in full and on time • Optimizing technology • Effective relationship with key stakeholders 	<ul style="list-style-type: none"> • Innovation • Abandonment • Increasing expertise and adaptability • Learning environment 	<ul style="list-style-type: none"> • Right people • Empowerment • Retention of key staff • Candor • Leadership • Recognition

Figure 16. Modified version of BSC framework with six performance perspectives. Adapted from Parmenter (2015).

Compared to the frameworks of Fitzgerald and Hudson, Parmenter's framework enables the consideration of performance more holistically, as both internal and external aspects of performance are included. On the other hand, many of the meaningful performance measures included into previous frameworks are missing from Parmenter's framework. For example, only three success factors are included into the internal process perspective, which is very important to the business operations as it describes how services are delivered to the customers. Compared to previous frameworks, for example success factors such as services and resource utilization are missing which are very important to the performance of an organization operating in service business.

4.6 BPM framework for SME service business

Performance is a central measure for all organizations but its formation is at least partly organization specific. This highlights the importance of the performance management framework as it guides the identification of these measures, or in this study, the identification of information needs. For performance measurement it is important that the balance between the different dimensions of performance is retained (Fitzgerald et al. 1991, p. 5). In a similar way, all relevant performance perspectives are to be taken into consideration when conducting information need assessments.

Three business performance management and measurement frameworks were introduced in the previous chapter. Despite the performance measurement centric approach, these frameworks can also be used when assessing performance information needs. From a performance information needs assessment point of view, all evaluated frameworks had weaknesses. None of them identified the different aspects of performance and related success factors comprehensively enough, nor on a needed level of accuracy. Besides, without taking into account Fitzgerald's framework, these frameworks were not adapted to be used in the service business context as performance themes such as waste or inventory performance were included.

The aforementioned factors highlighted the need to create a new BPM framework. For this reason, the researcher decided to produce a completely new framework, where the identified deficiencies could be removed and which therefore could provide better support for information need assessment. The framework was constructed in two steps. In the first step, a new framework was created based on the literature findings. In the second step, this framework was developed further during the data collection and analysis of the study to satisfy the needs of the target organization.

The BPM framework for the use of SMEs operating in service business was formed by combining three performance management and measurement frameworks together. The aim was to construct a framework which recognizes the different aspects of performance in a holistic manner and at the same time is suitable for the assessment of the performance information needs of SMEs operating in the service business context. This combined BPM framework is presented in Figure 17.

ENVIRONMENT AND COMMUNITY	FINANCIAL RESULTS	CUSTOMER FOCUS	INTERNAL PROCESS	INNOVATION AND LEARNING	STAFF SATISFACTION
<ul style="list-style-type: none"> • Relative market share and position • Customer base • Community leadership • Collaboration • Linking with future employees 	<ul style="list-style-type: none"> • Sales growth • Efficiency • Profitability • Cost control • Optimization of working capital • Risk management 	<ul style="list-style-type: none"> • Increase customer satisfaction • Communication • Integration with customers • Targeting key customers • Getting close to noncustomers • Competitiveness • Responsiveness • Image and appearance 	<ul style="list-style-type: none"> • Sales and future growth • Services • Delivery reliability and flexibility • Productivity and efficiency • Resource utilization • Effective relationship with key stakeholders • New product introduction • Optimizing technology 	<ul style="list-style-type: none"> • Innovation • Employee skills, expertise and adaptability • Learning environment • Resource utilization 	<ul style="list-style-type: none"> • Right people • Employee relationships • Employee involvement and empowerment • Quality of work life • Recognition • Retention of key staff • Candor • Leadership

Figure 17. BPM framework for the use of SMEs operating in the service business context. Adapted from Fitzgerald et al. (1991, p. 6), Hudson et al. (2001, p. 1102), and Parmenter (2015).

As one may notice, the six performance perspectives from the Parmenter (2015) framework were retained as such because even the modified version of the BSC framework is well known among a wide audience and recognizes the different aspects of performance in a holistic manner. Instead, the relevant performance themes under these perspectives were identified from each of the three frameworks and combined together. Only performance themes relevant to the SME operating in the service business were included into the framework.

Compared to the frameworks presented in the previous chapter, this new framework identifies the different aspects of performance in a more detailed way and therefore supports the holistic assessment of performance information needs more efficiently. This framework is especially useful from the viewpoint of SME operating in the service

business as only relevant performance themes are included. In this study, the term performance theme is replaced with the term information theme and the term performance measure with the term performance information need as these terms are more suitable for use in the case of information need assessment.

4.7 Summary

Business performance management, which is the most important theoretical aspect of this study, was presented in this chapter. Performance is a central measure for all organizations as it describes how well an organization reaches its goals. Performance management utilizes performance information in order to improve decision-making and ultimately the performance of an organization. In order to provide a holistic view and to satisfy managerial information needs, both financial and non-financial as well as qualitative and quantitative measures should be included.

Besides the overall term performance management (PM), multiple other terms are used in the literature. One of these terms is business performance management (BPM). BPM and BI are closely related concepts and at least partially overlapping. BPM is enabled with business intelligence, but at the same time only a subset of the information BI system delivers is in the focus of BPM. One way to define the relation between these two concepts is to review them as different stages of BI maturity where traditional BI is on a lower level than the BI, which is used for BPM.

Very often the development of an organization is supported by maturity models because these models improve the transparency of change and highlight the areas which require further attention and development. Multiple maturity models are presented in literature, one of which is the PM maturity model developed by Aho (2011). This maturity model is especially meaningful from the viewpoint of this study as it combines elements from both BPM and BI and can therefore be used when assessing the maturity of BI operations of an organization. Moving onto a higher maturity level means that an organization is performing more efficiently and that its business operations are more controlled and foreseeable.

Besides the maturity models, multiple frameworks for performance management have been introduced in the literature, among which the three most suitable ones were selected for an in-depth evaluation. Even though these frameworks were developed from a performance measurement centric approach, they can also be utilized when conducting information need assessments. Nevertheless, all evaluated performance management and measurement frameworks had weaknesses when reviewed from an information need assessment point of view, as these frameworks were not suitable in the service business context. Therefore, a BPM framework for SME operating in the service business was developed as a part of this study by combining these three frameworks together and by including only performance themes relevant to the service business context.

5. CONDUCTING THE STUDY

Chapter 5 describes the data collection and analysis methods and practices of this study. In the first subchapter, the data collection methods and the timeline are described on a general level. After that, the review is divided into three parts based on the methods used in the different steps of the data collection and analysis.

5.1 Data collection and analysis

The data collection for this study, which included the two main steps of information need assessment and BI current state assessment, was executed between 30.11.2015 and 23.2.2016. At the same time as data collection during the information need assessment was conducted with methods of focus group discussion and semi-structured interview, focus group discussion was chosen as the data collection in the BI current state assessment (Figure 18). As it is important that the chosen methods are suitable for the task (Vuori 2005, p. 311), both the weaknesses and strengths of multiple methods were evaluated during the selection process.

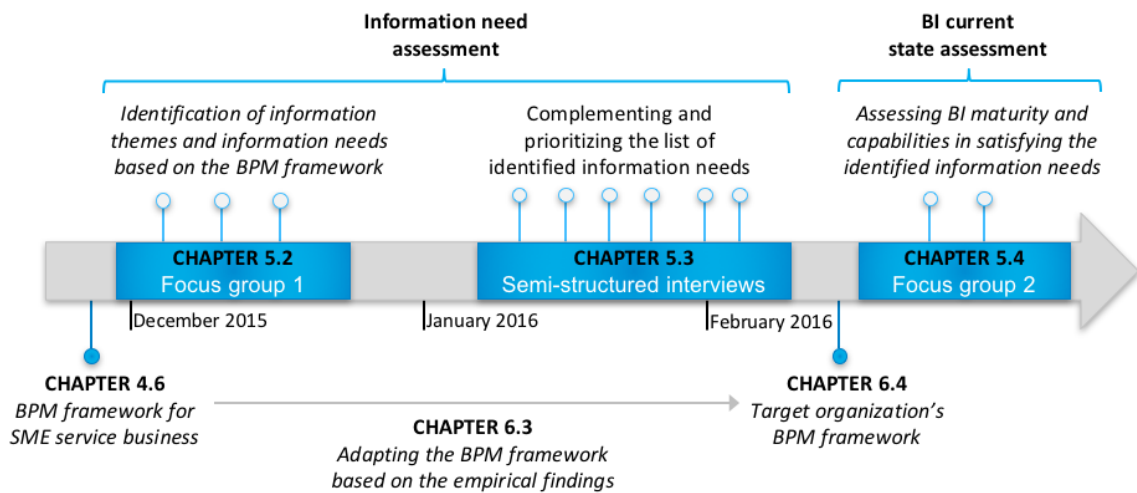


Figure 18: Data collection and analysis timeline of the study.

There are basically two ways to collect data as a part of an information need assessment. The first option is to analyze the findings of the previous studies in the literature, and the second option is to ask people about their information requirements and use. In this study, the information need assessment was conducted in two steps, both of which required the involvement of multiple members of the target organization. During the focus group sessions, the information needs were assessed by utilizing the knowledge of senior managers. These findings were then complemented by interviewing team managers.

The objective of the information need assessment was to identify and prioritize the team managers' information needs in the area of business performance management. In order to enable a comprehensive review of the performance, a BPM framework for the use of SMEs operating in service business was developed and used to direct the work. This framework, developed in the theoretical part of this study, was also adapted into a more useable format to meet the target organization's needs based on the empirical findings of the study.

In the second step of the data collection and analysis, an assessment of the target organizations' current BI operations was conducted. During this assessment, the requirements for BI development were identified by comparing the performance information needs with the current information offering. The target organization's current BI operations as well as the prospective development steps were also described based on the collected data by utilizing a maturity model.

5.2 Focus group discussions 1

A focus group discussion is a group working method where qualitative data is collected from the conversation sessions of the participants. These informal discussions are moderated and focused around a predetermined set of topics instead of answering structured questions, like in traditional group interview methods. (Silverman et al. 2004, p. 177) As people are encouraged to speak openly during these sessions, this method may enable sharing thoughts which would not have necessarily appeared by using traditional interview methods (Dorner et al. 2015, p. 169). This method was chosen because it is very intuitive, flexible and capable of providing good quality information.

The objective for the data collection was to identify the relevant information themes and performance information needs from the team managers' perspective. A comprehensive consideration of performance was enabled by reviewing the different aspects of performance with the help of the BPM framework and the six performance perspectives included in the framework. During the identification, the target organization's strategy was also taken into consideration due to the strong linkage between performance management and strategy.

A small number of participants is typical to this research method (Silverman et al. 2004, p. 178), and sometimes only two or three people are included (Edmunds 1999, p. 19-20). The participants of these sessions were the Chief Financial Officer (CFO), the Chief Operating Officer (COO) and the researcher of the study who was also responsible for moderating the meeting. The participants were selected based on their areas of expertise. As the performance information needs were to be identified by taking into consideration the target organization's strategy, the members of the top management were seen as the obvious choice.

The focus group 1 was organized in three parts. The first part of the group discussions was held on 30.11.2015, the second part on 4.12.2015 and the third part on 10.12.2015. Altogether these sessions lasted 4,5 hours. At the beginning of the first session, the researcher introduced the BPM framework developed during the theoretical part of the study. This introduction was quite straightforward, as the performance perspectives recognized in this framework were based on a modified version of a balanced scorecard. Both participants were familiar with the original BSC framework as it is used in the target organization, for example as the basis of the strategy map. Besides introducing the framework, relevant terms such as performance and information need as well as the objectives for the meetings were defined, so that all participants had a uniform view of what was to be discussed during these sessions.

The moderation of focus group discussions can be done with a series of open questions, by utilizing stimulus materials (for example a video clip), by leveraging certain activities (for example certain exercises) or by using a combination of these different means (Silverman et al. 2004, p. 177). In this study, the focus group sessions were moderated by dividing the discussions based on the six performance perspectives acknowledged in the BPM framework. Guidance to the conversations was also given by identifying some information needs under each of the performance perspectives in advance, which were then used as an example at the beginning of the first session.

The BPM framework developed during the theoretical part of this study directed the information need assessment of this study. This assessment was conducted by examining each of the six performance perspectives separately. During this assessment, relevant information themes were identified from the framework from the target organization's perspective and complemented with additional information themes when needed. Once this was done, multiple information needs were listed under each of these themes. The target organizations' strategy map was also reviewed and team managers' tasks and responsibilities were kept in mind during this process, so that all the relevant information themes would be included.

The BPM framework was developed further based on the findings made during the focus group discussions. During these changes, the BPM framework was simplified by combining linked information themes together and by making changes to naming conventions. The changes were made in an iterative manner after each of the three sessions. At the beginning of each session, the latest version of the BPM framework was presented to the participants, which also helped in recalling the discussions and the findings made during the previous session.

Focus group discussions are often recorded, transcribed and then analyzed (Silverman et al. 2004, p. 178), which was the case in this study as well. Besides making remarks during the sessions, a deeper analysis was enabled by recording the discussions. The notes

were corrected and supplemented based on the analysis of the recordings, which was done after each of the three focus group meetings.

The findings of the focus group sessions were listed after the focus group discussions and reviewed with the Chief Operating Officer of the target organization. During this meeting, the final adjustments to the BPM framework and the identified information needs were made. As a result of the focus group sessions, a total of 23 information themes and 166 information needs were identified. The use of the BPM framework was seen to help in identifying the information needs in a holistic manner.

5.3 Semi-structured interview

Even though multiple data collection methods can be used when assessing information needs, interviews and observation often provide the best outcome (Nicholas 2005, p. 12). This is one of the reasons why using interviews was chosen for collecting data for this study. As already mentioned, these interviews were conducted as a continuum to the focus group discussions. They were seen as an effective method to deepen the existing understanding of managerial performance information needs from the team managers' point of view. The objective of these interviews was to validate and prioritize the list of identified information needs as well as to complement the list if a relevant information need was missing.

Interviews can be carried out as structured, semi-structured or unstructured based on the degree of structuring of the interview questions and the control of the interviewer in the interview situation. In a structured interview, both the interview questions and the answering options are kept the same in all interviews. When a semi-structured interview method is chosen, the interview questions are kept the same, but the answering is done freely and not by selecting from ready-made answering options (Aaltola & Valli 2010, p. 28). In an unstructured interview, where questions are not prearranged and where the conversation is not controlled according to the plan of the interviewer, more freedom is given to the interviewee.

The semi-structured interview method, which is also referred to as the theme interview, was chosen for this study, because predetermined questions support the interviewer's work, but at the same time the method gives more freedom for both the interviewer and the interviewee to have a conversation around predetermined themes. In this study, the interviews concentrated around the six performance perspectives (interview themes) identified in the BPM framework. In order to support a holistic identification of performance information needs, open questions and conversation were also utilized during the interviews, which is more typical to the unstructured interview method. Despite this, as all of the interviews of the study were conducted in a more or less similar fashion, and mostly prearranged questions were used, these interviews can be defined as semi-structured.

As the objective of this study was to investigate the managerial information needs of team managers, it was necessary to collect data from employees in that position. The selection criteria was therefore based on the job description of the interviewee. The interviewees were selected so that the members of multiple teams from different parts of the target organization would be included. Especially teams providing different types of services with different service delivery models were selected to gain a comprehensive view of the managerial information needs. For example, one of the interviewees was from a team providing services for short customer projects (approximately 1-2 weeks in calendar time) and another interviewee's team's operation was based on providing continuous services.

During this study, six individual interviews were performed, one of which with a member of the top management. The other five interviewees were team managers, which is about 33 percent of all the 15 team managers on the operative level of the target organization. This group is called the total population, and the people selected for interviews as the sample (Saunders et al. 2009, p. 210-212). The selected sample size is set large enough, so that generalizations are possible and that conclusions may be drawn about the managers' information needs (Dorner et al. 2015, p. 99) without investing an excessive amount of time and money to the data collection, or on the other hand, without compromising the accuracy of the results (Saunders et al. 2009, p. 218).

The interviews were carried out separately and executed between 25.1.–10.2.2016 as described in Table 3. Most of the interviewees had been working in a managerial position for multiple years. None of the interviewees were hired into the managerial position originally but they were promoted into this position by experience. Besides the managerial position in the target organization, some of the managers had also managerial work experience in their previous employment, which is not included into years listed in the table. It was decided that detailed information concerning the interviewees and their teams is not mentioned in this study.

Table 3: List of interviewed managers.

	Title	Interview date	Years in target organization	Years in managerial position	Number of team members	Services and projects
Interview 1	Manager	25.1.2016	8 years	4 years	9	Short projects
Interview 2	Manager	27.1.2016	8 years	1 year	10	Continuous services and projects
Interview 3	Manager	1.2.2016	8 years	5 years	4	Continuous services and projects
Interview 4	Manager	3.2.2016	6 years	1 year	5	Projects
Interview 5	Senior manager	8.2.2016	12 years	6 years	44	Continuous services and projects
Interview 6	Manager	10.2.2016	7 years	5 years	6	Continuous services

As mentioned earlier, interviewee 5 is a senior manager and also the target organization's management team member. Their responsibilities and tasks are therefore very different compared to the team managers. The senior manager was chosen to be interviewed, as they are responsible for four teams and therefore aware of the team managers' tasks and information needs.

The interviews, which lasted an average of 1,5 hours each, were conducted in the office facilities of the target organization. The interviews were booked based on the availability of the interviewees, rather than in a planned order. A calendar invitation, containing general information about the study, was sent to the chosen managers on 19.1.2016. All interviewees accepted the invitation, and the interviews were conducted as planned.

The interview situation was informal, as the interviewer was familiar with all of the interviewees. The structure and questions used in the interviews are presented in Appendix 1. At the beginning of the interview, the most important terms were defined, including performance management and information need. For most of the interviewees, especially the term information need was unclear and therefore required clarification before continuing the interview. The term performance, on the other hand, was perceived in a negative light to include only short-term financial measures and goals by some of the interviewees.

Questions concerning the background of the interviewee were presented at the beginning of the interview. One of these questions was about the interviewee's work years in the target organization. After the background questions, the BPM framework of the study was presented to the interviewees in order to describe a comprehensive definition of performance and to open up the conversation. At this point, the list of previously identified information needs was kept hidden, so that it would not interfere or restrict

the managers' thinking. Questions like "*What information do you use?*" were presented. The conversation was targeted at one of the six performance perspectives at a time, and during the interview further questions were asked to deepen understanding. Very often, the most interesting information needs were mentioned alongside some other point the interviewee described. In addition, the conversation often concerned multiple information themes and performance perspectives at a time, which also highlighted the multifaceted nature of an information need.

In the second step of the interview, each of the performance perspectives was reviewed individually by showing the list of identified information needs to the interviewee. The BPM framework and the related information needs identified during the focus group discussions were used at this point. The interviewee was requested to read the list through and evaluate the identified information needs from the viewpoint of their own work. At this step, the focus was on finding which information needs were seen as the most important by the interviewees and if a particular information need on the list was seen as unnecessary. During these interviews, the interviewees disclosed multiple information needs, which had not been recognized during the focus group discussions. Many of the previously identified information needs were also reformed into a more suitable format to meet the needs of the team managers. Only very few of the listed information needs were seen as unneeded by the interviewees.

The interviews were recorded, transcribed, and then analyzed. The analysis of the transcripts was done by dividing the interview data into appropriate categories by using coding. The aim of analysis was to link the interview data with the findings made in the previous step of data collection. As the BPM framework was utilized during the interviews, the analysis of the interview data was a lot easier and faster to perform, as the answers could be divided into meaningful sections. Like in the previous step of data collection, the BPM framework was developed further based on the findings made during the interviews. In comparison to the focus group sessions, the changes made to the framework were more focused on individual information needs rather than on making changes to the performance perspectives or the identified information themes.

An interview summary report was sent to the interviewees after the interview. The summary contained notes of the main findings of the interview. This was done soon after the interview, so that the conversation was still fresh in the interviewee's memory. The aim was to improve the reliability of the interviews, as the interviewees were given the opportunity to make corrections or to provide additional information if something was forgotten during the interview. None of the interviewees saw the need to make corrections or to provide additional information after the interview.

5.4 Focus group discussions 2

Once the information need assessment was completed and the findings were summarized, the identified performance information needs were compared with the target organization's current information offering. The main objective for this part of the data collection was to assess how well the identified information needs can be satisfied with the current business intelligence capabilities. The secondary objective was to describe the target organization's current BI maturity, which required information about the components of the target organization's BI environment. By identifying the current state of BI operations and its capabilities in meeting the team managers' information needs, the researcher of the study could then make recommendations for the next steps in the BI development path.

The focus group discussion method was selected for this task as it had proven its feasibility in the first step of the data collection. As knowledge about the target organization's business operations was required, focus group discussion was seen as a suitable data collection method. In addition, by using this method, the researcher's own knowledge about the BI environment, such as information systems and processes, could also be utilized.

The focus group discussions were organized in two parts. The first session was held on 18.2.2016 and the second session on 23.2.2016. Altogether, these group discussions lasted three hours and were organized in the office facilities of the target organization. The same group of managers who participated in the first focus group discussions took part in this session as well. The Chief Financial Officer (CFO) and the Chief Operating Officer (COO) of the target organization were selected for this task based on their areas of expertise, as these senior managers were familiar with the current BI operations. Especially their vision of future BI operations was seen as important from the perspective of this study.

At the beginning of the focus group session, the researcher introduced the findings of the information need assessment with the help of the BPM framework, which was developed into its final format based on the findings made during the previous steps of the data collection. Due to the vast amount of identified information needs and limited amount of time reserved for the sessions, the information needs were not reviewed one by one. Instead, the researcher highlighted the most relevant information needs from each performance perspective as well as outlined the identified dependencies between these needs. Once all the participants were familiar with the findings of the information need assessment, the discussion was turned into target organization's current BI operations and its capabilities in meeting these needs. This review was conducted mostly on the level of information themes. The challenges in meeting these needs with the current BI capabilities and the information at the team managers' disposal were discussed in particular.

Once the target organization's current BI capabilities in meeting the identified information needs were assessed, the target organization's BI environment could be described. The BI maturity model was chosen to be used in this study as it increases the understanding of the current state of BI and improves the transparency of change during the business intelligence development. In addition, it can be used to highlight the areas, which require further attention during this process. The maturity model developed by Aho (2011) was chosen to be used in this study. However, as the original format requires answering a total of 284 statements in order to determine the current maturity level, it was decided to streamline this process, as it was seen too time consuming for this study.

As a lightweight alternative, the target organization's current BI maturity level was determined by describing the characteristics of its BI operations with the help of the statements introduced in Aho's maturity model and by comparing these characteristics to the maturity model descriptions. Five main components of PM were taken into consideration during the characterization, including intangible assets, information, strategy and business, performance and technology. The four supporting components – management and responsibility, communication, methods and tools, and scale and scope – were decided not to be used in this study, as they would have scattered the review of BI operations into too many categories and in this way complicated the formation of the overall image.

The maturity model of Aho (2011) and the maturity levels included into this model were introduced to the session participants. The objective was to identify the characteristics for the target organization's current BI operations and in this way determine its maturity amongst the five maturity levels. During this work, the aim was to identify the target organization's information systems, integrations, data analysis tools as well as processes and procedures and compare them against the maturity model descriptions. To help getting started in this work, some characteristics of the target organization's BI operations were identified in advance based on the researchers own knowledge and then used as an example at the beginning of the session. At the end of the second session, the current maturity level of the BI operations was determined by comparing the list of identified BI characteristics with the maturity level descriptions.

Besides making remarks during the sessions, the researcher also recorded, transcribed and then analyzed the focus group discussion sessions. The notes were corrected and supplemented based on the analysis, which was done right after the sessions. As a result of the focus group discussions, an understanding of how well the identified performance information needs can be satisfied with the current BI capabilities was gained. In addition, with the help of these sessions, the target organization's current maturity level of BI operations was determined and the guidelines for BI development were identified. These findings were documented in the study report and adjusted and complemented based on the received comments from the session participants after the session.

6. RESULTS: PERFORMANCE INFORMATION NEEDS AND BI

Chapter 6 introduces the results of the BI current state assessment and the information need assessment conducted as a part of this study. At the beginning of this chapter, the target organization's BI operations are described. After that, the maturity level of the business intelligence is defined by utilizing the maturity model developed by Aho (2011). The team managers' performance information needs are presented by first introducing the target organization's BPM framework and then by dividing the assessment into the six performance perspectives acknowledged in the framework. At the end of this chapter, the challenges in meeting the team managers' performance information needs are identified by comparing the information needs and the business information provided with the current BI capabilities.

6.1 BI environment and operations

Managerial activities on the operative and tactical levels in an organization are often supported with ERP and other functional information systems which use mainly internal information sources (Turban & Volonino 2010, p. 52-53). The target organization utilizes multiple information systems, tools and processes as a part of its business operations. Currently, the focus of the BI is on managing the performance information produced with the operative information systems. Especially the professional services automation (PSA) system, accounting system, project management portal and intranet portal are utilized in order to support the team managers' work. In addition to the information systems, also surveys concerning employee satisfaction and customer satisfaction have an important role in performance information acquisition. The target organization's Operations and Finance team members are responsible for the current business intelligence activities.

The target organization's information systems and BI are currently in a transition phase. This transition started as a part of a business acquisition which initiated the implementation of a new PSA system. The PSA system is a special type of information system which is designed for professional service organizations to support their core business processes, such as resource management and customer relationship management. The PSA system, which was used in the acquired company, was extended to the use of the whole organization as a part of the integration process of the two organizations. During the implementation, this system was also updated to the latest version which required changes to the organization's processes.

The PSA system is essential for the target organization's business operations as it is used for customer relationship management, sales management, resource management, time recording, billing and reporting. This system is also integrated with the accounting system to improve the efficiency of the financial business processes. Even though the basic functions of the PSA system are widely used in the target organization, the implementation and tailoring of this system are still partly on-going. The underlying causes for the challenges in the use of the PSA system are identified to be the differing needs of the teams and the constraints of the system. As a result, the target organization has had to settle into a lower level of BI.

As defined during the theoretical part of this study, there are great organizational differences in how easily certain information can be captured and used. Based on the focus group discussions with the senior managers of the target organization, especially limitations in the reporting and analytical capabilities of the systems, lack of integrations between the systems, lack of master data management and data quality issues are known challenges in the current BI environment. The most visible part of the current BI activities is the financial reporting, which is supported with the PSA system, financial management system and excel files, which require manual data gathering and maintenance. Even though financial information has an important role in the target organization's BI, cost savings are not the primary driver for these activities.

The target organization is not currently utilizing data warehousing as a part of its BI operations. This does not mean that the target organization would not be utilizing business intelligence, but the lack of a data warehouse suggests that the whole potential of BI has not yet been reached. As noted earlier, all organizations are practicing BI on some level even though this activity might not be systematic or even conscious (Laihonen et al. 2013, p. 46). In addition to the term business intelligence, the terms reporting, analytics, situational picture and situational awareness are also often used to describe these types of activities. As one of the interviewees described: *"Especially on the operative level, which is affected by daily business activities and their challenges, performance management is about situational management."* (Team manager 10.2.2016). Despite the variation in the used terms, these activities are designed to support decision-making as well as other organizational activities and can therefore be defined to be the target organization's BI activities.

6.2 Current BI maturity and capabilities

The target organization's current BI maturity was assessed with the PM maturity model developed by Aho (2011). Even though this maturity model was developed for the performance management context, it can be utilized when assessing business intelligence maturity. In particular, because BPM and BI are closely related concepts and at least partially overlapping (Rausch et al. 2013, p. 6; Grossman & Rinderle-Ma 2015, p. 150).

The target organization's BI maturity was determined by first describing the characteristics of its BI operations and then by comparing these characteristics with the maturity level descriptions. The current state of the BI was characterized with the five main components of PM included into Aho's maturity model: intangible assets, information, strategy and business, performance and technology. With the help of these components, a number of different perspectives were included into the assessment. The characteristics of the target organization's current business intelligence are listed below. The positive characteristics of the current state are marked with a check mark and the characteristics requiring further development with a minus sign. This way the required development areas can be easily noticed.

- Intangible assets
 - ✓ Open and strong organizational culture
 - ✓ Little organizational resistance towards developing working methods
 - ✓ High technological skills and competencies
 - ✓ Management responsibility areas are determined and documented
 - ✓ Senior management participates actively in business operations
 - Limited skills and understanding of analytical tools and DW
 - Inadequate induction and training of the team managers
 - BI competency center does not exist
- Strategy and business
 - ✓ Strategic planning has an important role
 - ✓ Strategy implementation is transparent and continuous
 - ✓ Business operations are adaptable and flexible
 - ✓ Continuous development and improvement of business operations
 - ✓ Cost savings are not the primary driver in business development
 - ✓ Need for informed decision-making has been identified
 - Decisions are often based on intuition and business instinct
 - BI is not consciously practiced and its value is not fully understood
 - No senior management support for data warehouse investment
- Performance
 - ✓ Sales and financial performance measures are not overemphasized
 - ✓ Customer satisfaction is continuously measured
 - ✓ Reporting practices are partly documented
 - Lack of consistent and clear picture of the company for the managers
 - Employee satisfaction is measured only once a year
 - PSA systems restrictions interfere with reporting and business operations
 - Informal and ad-hoc reporting is often used
 - Reports are built on operational information systems
 - Financial reporting requires manual data gathering

- Reports do not satisfy identified information needs of team managers
- The team managers are incapable of relying on the PSA system reports
- Inadequate competitor and market analysis capabilities
- Information
 - ✓ A couple of reports tailored for the use of team managers
 - ✓ Some common structures and procedures for the collection and dissemination of information do exist
 - ✓ Basic business vocabulary is defined
 - Issues with data and information quality and consistency
 - Information is not processed enough to satisfy the team managers' needs
 - Overlapping data and information in different information systems
 - Lack of external information concerning competitors and market
 - Issues with organization wide knowledge sharing
 - Deficiencies in the data and information life cycle management
 - No master data management in use
 - Deficiencies in data and information ownership and classification
- Technology
 - ✓ Relatively few actively used legacy systems
 - ✓ Limited amount of potential source systems for data warehousing
 - ✓ Information systems ownerships are defined
 - Partially overlapping information systems
 - Differences in the use of information systems and tools between teams
 - Data warehousing or data marts are not used

Based on the comparison of the listed BI characteristics and the maturity level descriptions, the target organization's current BI maturity level was determined to be "*information silos*". This is the lowest maturity level described in Aho's maturity model, which implies that the current BI operations of the target organization are in the early stage of their maturity. Nevertheless, many of the identified BI characteristics are well beyond this maturity level, which suggests that the target organization's BI capabilities are higher than what the maturity level suggests. For example, "*open and strong organizational culture*" is more common on the third and higher levels of maturity. However, as BI activities can be seen as sustainable only when the requirements of the previous maturity levels are established, most of the described characteristics should be satisfied before moving onto the next maturity level (Aho 2011, p. 191). By looking at the list of identified BI characteristics, major differences can be noticed between the five components. For example, the characteristics demanding further development are mostly found in the components of performance and information while the components of intangible assets, strategy and business and technology are better supported. This proposes that the target organization's BI maturity varies also between the components.

6.3 Target organization's BPM framework

The BPM framework for the use of SMEs operating in service business was developed in the theoretical part of this study in order to support the assessment of the team managers' performance information needs. The six performance perspectives acknowledged in this framework are environment and community, financial results, customer focus, internal process, innovation and learning and staff satisfaction. Based on the collected data and the known requirements of the target organization, this framework was adapted into a more useable format during the empirical part of the study.

The performance perspectives were modified into a format which is better suitable for the target organization's use. Besides simplifying the naming convention, these perspectives were modified by taking into consideration the target organization's culture and vocabulary. This was seen important as it has been *"a conscious choice not to use certain terms in order to highlight the flat organizational structure and the importance of our professionals."* (CFO 30.11.2015). The use of terms such as staff, resource or even employee are seen to send a wrong message. For this reason, the performance perspective named *"staff satisfaction"* was renamed as *"people"*. At the same time, the performance perspective named *"innovation and learning"* was refined into its original format *"learning and growth"* as earlier defined in the BSC framework by Kaplan and Norton. In this format, the BPM framework is more suitable for the target organization's use, as continuous learning is one of the preconditions for organizations providing professional services. Innovation, which is also important for the target organization, is included into this perspective.

With the help of these changes, the BPM framework was modified into a format which is easier to embrace by the members of the target organization. The six performance perspectives acknowledged in the target organization's BPM framework are environment, finance, customer, internal process, learning and growth and people (Figure 19). Together, these perspectives cover the most important aspects of performance management and enable a comprehensive assessment of information needs. In its final format, the BPM framework was seen as very suitable for the target organization's use. It was also commended for its distinct presentation by multiple interviewees particularly because it recognizes the environment as a separate entity and highlights employees and their importance to the target organization's performance with the two perspectives *"learning and growth"* and *"people"*.

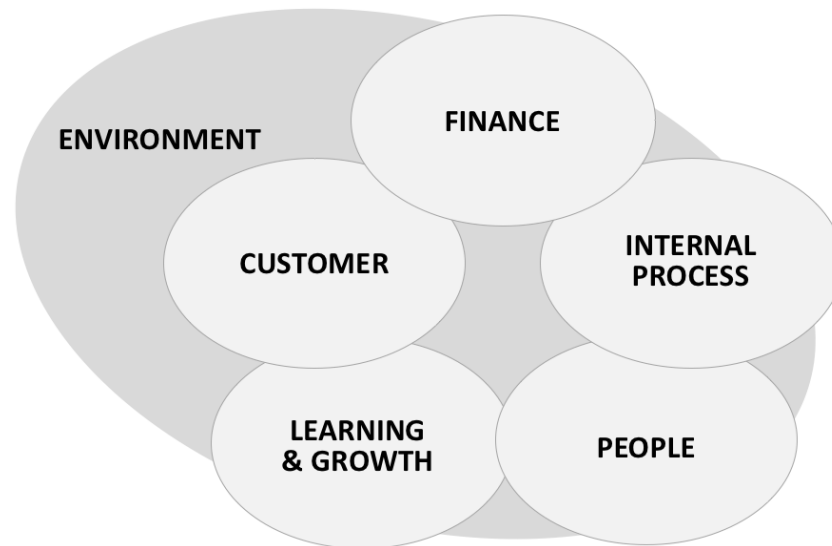


Figure 19: The six performance perspectives acknowledged in the target organization's BPM framework.

Each of the six performance perspectives in this framework review performance from a different viewpoint. The information needs in the environment perspective relate to the external business environment and community, for example, to competitors and the market. It was described during the focus group discussions that, *"the environment engages all the other performance perspectives and it is therefore a good thing that it is described as an ocean around all these other performance perspectives."* (COO 4.12.2015). The business environment has a great effect on the target organization's performance while its own capabilities in affecting these information themes are limited. The customer perspective, on the other hand, is somewhat different as it is continuously affected by the target organization's actions among multiple other factors. This performance perspective views the target organization's business operations from the customer perspective, which is especially important in the context of professional service business. The internal process perspective, on the other hand, views the target organization's business operations through the processes and procedures which are aimed to satisfy the identified customer needs. Nevertheless, as these *"internal processes are only put into place in order to ensure the output of business operations, these processes should be as lightweight as possible."* (CFO 10.12.2015).

The performance perspective of finance is focused on the traditional financial performance information needs which are affected by all the other performance perspectives. However, as these information needs are viewed from the team managers' perspective, not all financial aspects affecting the target organization's financial performance are included. Besides these mostly quantitative financial performance information needs, the performance perspectives of learning and growth and people are highly related to the qualitative side of performance which affect the target organization's performance especially in the long term. As one of the interviewees stated, *"our professionals are*

our engine, and therefore it is easily justified that two of the performance perspectives are devoted to this aspect.” (Team manager 1.2.2016). Learning and growth includes the performance information needs related to aspects such as employee skills and competence. The people perspective, on the other hand, is about finding the right people and supporting their engagement and satisfaction.

In this study, the team managers’ performance information needs are described by utilizing a three level categorization, which includes the levels of performance perspective, information theme and information need (Figure 20). In this categorization, performance is first divided into the six performance perspectives and then into multiple information themes and the actual performance information needs of the team managers. For example, underneath the performance perspective *“Environment”* is the information theme *“Competitors”* and the information need *“Which companies are our most relevant competitors?”*. In this way, the identified information themes summarize the identified performance information needs.

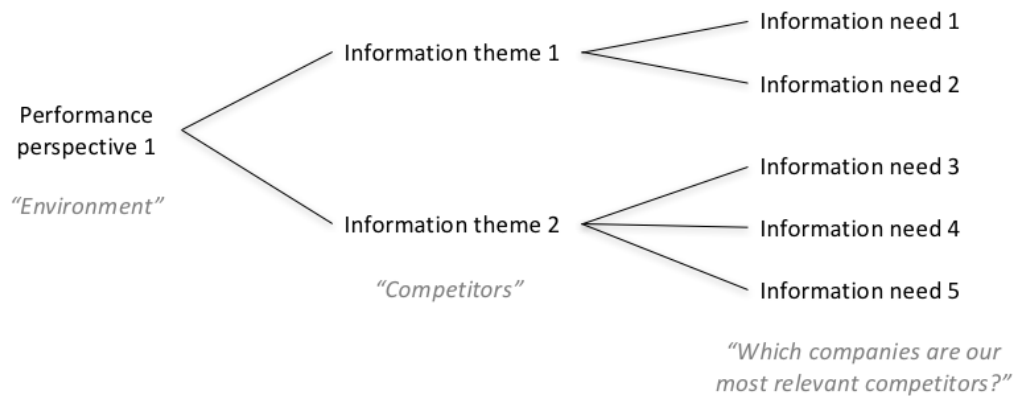


Figure 20: Three level categorization: performance perspective, information theme and information need.

Besides being adapted to the performance perspectives, the information themes underneath these performance perspectives were also modified to meet the target organization’s requirements. Even though the original version of the BPM framework was designed especially for the use of SMEs operating in service business, it included information themes which were somewhat irrelevant when perceived from the team managers’ point of view. One example is the information theme *“Optimization of working capital”* which is not a central aspect for the managers’ on the operative level. Besides, there was a need for simplification, as this framework included over 30 information themes, some of which partially overlapping. For example, the information themes *“Employee involvement and empowerment”* and *“Quality of work life”* were combined and renamed as *“Employee engagement”*.

6.4 Team managers' performance information needs

The target organization's BPM framework is introduced in Figure 21. This figure summarizes the findings of the information need assessment of the team managers' performance information needs by introducing the six performance perspectives and 25 information themes identified in this study. All interviewees described various information needs concerning all of the performance perspectives.

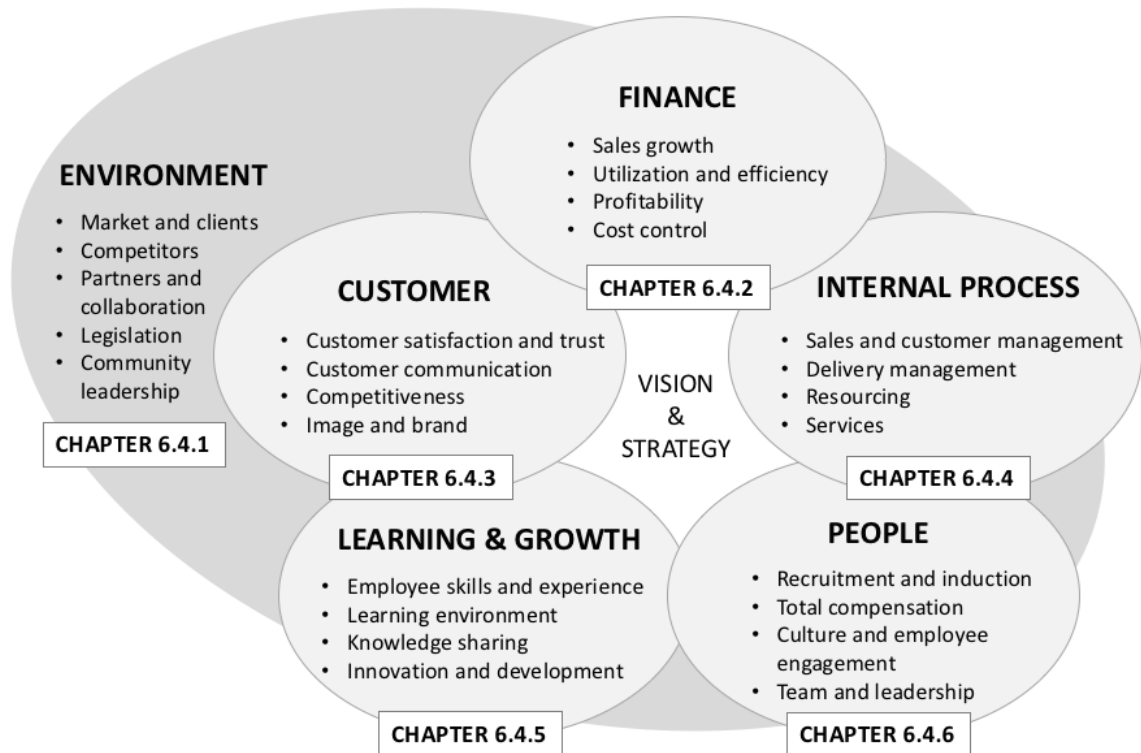


Figure 21: The target organization's BPM framework: six performance perspectives and identified information themes.

Altogether, 173 information needs were identified during the study. These information needs are introduced in the following subchapters by reviewing one of the six performance perspectives at a time. The information needs are presented in the form of short questions, because in this way, these needs can be seen as questions the team managers present as a part of their information seeking behavior. The information needs, which multiple interviewees highlighted during the interviews, are marked in bold, and in this way indicated to be important. Nevertheless, as information needs were also identified during the interviews of the team managers, this classification is only indicative, as not all information needs were reviewed by all interviewees.

6.4.1 Environment

The first one of the six performance perspectives recognized in the target organization's BPM framework is the environment, which examines the external business environment and community and their effect on the organization's performance. This is especially important because *"we have very limited control over this perspective and therefore we need to be very adaptive to the changes in the environment and community"* (Team manager 27.1.2016). For this reason, there is a need for the team managers to be aware of the changes in the business environment. It is especially important because customer needs are also affected by these changes. The identified information themes and information needs related to this performance perspective are listed in Figure 22.

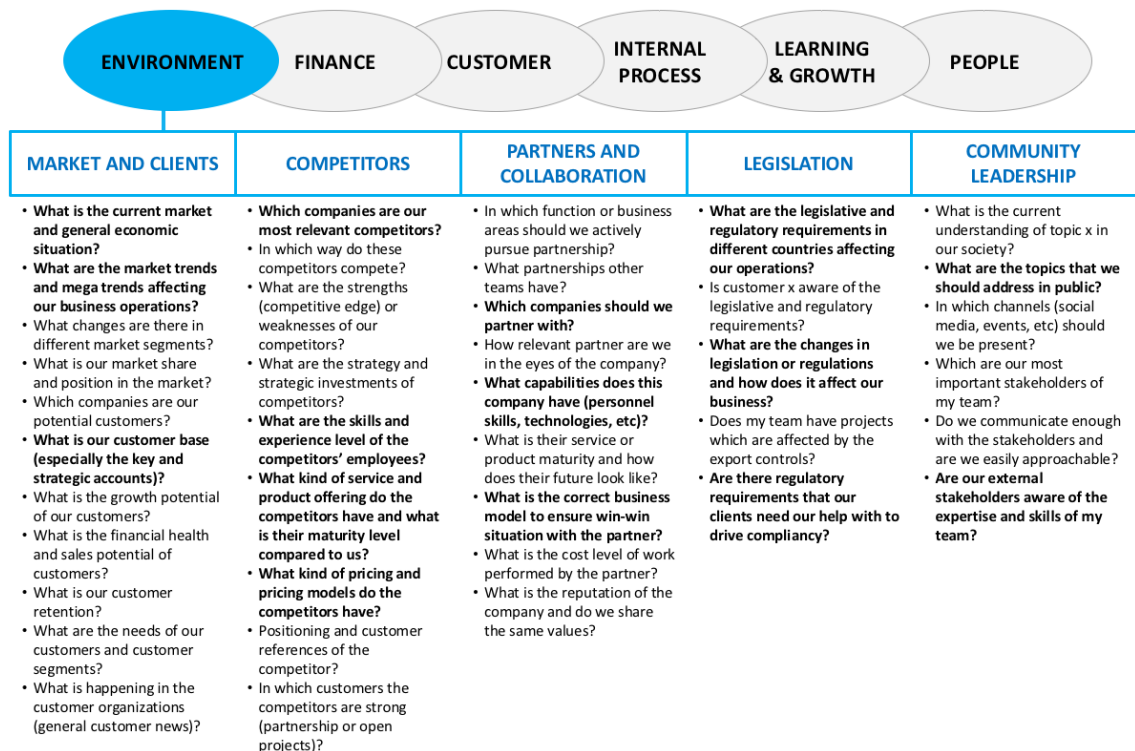


Figure 22: Managerial performance information needs: Environment.

In practice, all interviewees needed information about the market and clients, competitors, partners and collaboration as well as legislation, whereas community leadership divided opinions. The information themes of market and clients and competitors were seen especially important, even though the external business environment as an information subject and source is usually highlighted in strategic decision-making. Despite that team managers are usually not responsible for forming partnerships or keeping up with legislative requirements, many of their tasks are affected by the identified information themes. As was noticed during the focus group discussions: *"The business environment is very important to understand, and some part of the organization needs to be aware of all these aspects and especially the changes."* (CFO 4.12.2015). Next, the most important findings are highlighted from each information theme.

Market and clients

The target organization is operating in a business area which is fast-growing and therefore continuously changing, which highlights the need to keep up with these changes. *“What are the market trends and mega trends affecting our business operations?”* is therefore the most important information need in the information theme of market and clients. This information need was repeated in multiple interviews in slightly different terms. The team managers have a clear need to understand the current market situation and the trends affecting it. This information is needed as it affects customer needs and demands and in that way also internal processes, such as service development and recruitment. The team managers also need information about the general economic situation as well as the customer base and its growth potential. As one of the interviewees mentioned: *“The general economic situation affects our customers’ budgets and causes saving pressure which affects us.”* (Senior manager 8.2.2016). The information needs *“What is the current market and general economic situation?”* and *“What is our customer base (especially the key and strategic accounts)?”* were therefore defined to be rather important by multiple interviewees.

Competitors

Information concerning the competitive landscape is one of the team managers’ key information areas. For this reason, the information need *“Which companies are our most relevant competitors?”* is important for the team managers. Multiple interviewees described a need for this type of information. The target organization has multiple domestic competitors, and as a part of the internationalization the amount of competitors is growing. What makes this even more challenging is that while these companies are competitors in one business area, they are often partners or customers in another area. At the same time, *“the size of the competitive company is not crucially important as startup companies may also sometimes be a tough opponent.”* (CFO 10.12.2015). Therefore, it was seen important to keep an eye on startup companies and potential new competitors in other business areas as they might have completely new ways of meeting customer needs.

For the team managers, it is important to be aware of what is the competitive edge of the different competitors. *“Besides knowing which companies are our competitors, there is also the need to know in which way these companies compete as there are some companies which bend the rules. We want to play hard but by the rules.”* (COO 10.12.2015). And as one of the interviewees described: *“The whole idea is to be aware of how we compete with our competitors.”* (Team manager 3.2.2016). The team managers use this type of information, for example in service development as well as in sales and marketing.

One of the interviewees described the current situation with the following words: *“We are lacking capabilities in recognizing the competitive situation even though we know our competitors, their services and the general price range. It is probably very common for a company of this size not to invest heavily into market intelligence and analytics.”* (Team manager 25.1.2016). In service business, the competitive edge is mostly about the competence and skills of the competitors’ employees. An important information need was therefore defined to be *“What are the skills and experience level of the competitors’ employees?”*. Besides, the following information needs were also highlighted: *“What kind of service and product offering do the competitors have and what is their maturity level compared to us?”* and *“What kind of pricing and pricing models do the competitors have?”*.

Partners and collaboration

The target organization is utilizing partnerships in multiple areas, for example, technology and product partnerships, retailers and subcontractors. The team managers’ role in forming these partnerships and collaboration varies between the partnerships. Nevertheless, before partnerships can be concluded, the team managers’ information needs of *“Which companies should we partner with?”* and *“What capabilities does this company have (for example personnel skills, technologies, etc?)”* are to be satisfied.

During the interviews, multiple team managers mentioned that the partnerships are not always as balanced as they should be: *“Very often partners are trying to use our services but at the same time they do not share their core competencies or knowledge with us.”* (Team manager 25.1.2016). On the other hand, partnerships and collaborations are often affected by changes in the environment, as described during the focus group discussions: *“For example, product partnerships are often very delicate equations for disruptions. Especially due to some customer or market change. Therefore, the key question is what is the right business model for each case to induce a win-win situation.”* (COO 10.12.2015). Therefore, one of the main information need of the team managers in this information theme was defined to be *“What is the correct business model to ensure win-win situation with the partner?”*. This question is often very demanding to answer but at the same time very important especially in the long term.

Legislation

Information about legislation was seen as an important information theme for the team managers but not in a similar way as the other information themes under the environment perspective. Legislation related information was seen as something that the target organization’s supportive functions should provide to the team managers in a useful format. Therefore, *“company-wide things, such as labor legislation related guidelines should be tackled by the internal service functions.”* (COO 10.12.2015).

In this information theme, great differences were noticed between the teams. The team managers' information needs are mostly related to operating in a foreign country due to the possible legislative and regulatory differences. The information need *"What are the legislative and regulatory requirements in difference countries affecting our operations?"* was therefore defined. This information need is highlighted in certain teams which are conducting international assignments more often than other teams and using certain types of tools as a part of their work. For example, export control related things need to be taken into consideration when conducting the customer projects. *"From the team managers' perspective, it is important to know what are the things you are allowed to do in a certain country. For example, privacy related things or the use of a certain specialist software. There are great differences between countries even within the EU."* (CFO 10.12.2015). Besides, some teams in the target organization provide services which are related to legislative and regulatory aspects. Therefore, especially the information need *"Are there regulatory requirements that our clients need our help with to drive compliancy?"* was defined important.

Community leadership

In this study, community leadership refers to the ways in which the target organization acts responsibly as a part of the society and affects people's awareness and understanding of important things. Earlier community leadership was approached from the marketing perspective: *"We wanted to encourage public appearance for our consultants and in this way get publicity and make the company brand known. Nevertheless, our focus is on moving towards the community leadership mentality."* (CFO 4.12.2015). As mentioned during the interview, *"we want to influence the surrounding society and its understanding of current topics in our field. ..today and tomorrow the things that should be addressed in public are completely different."* (COO 4.12.2015). Community leadership is also mentioned in the target organization's strategy, which is one of the reasons why this information theme was emphasized during the focus group discussions. Nevertheless, multiple interviewed team managers also mentioned the need for this type of information, and the main information need in this information theme was defined to be *"What are the topics that we should address in public?"*.

6.4.2 Finance

BPM has traditionally concentrated in the historically oriented financial measures, as defined in the theoretical part of the study. These measures are important for all organizations and their managers on different managerial levels. Nevertheless, in the target organization, great value is given to both financial and non-financial as well as qualitative and quantitative performance measures. As noticed earlier, especially in growing companies, new financial controls are required since the previous management methods are no longer sufficient. In the target organization, growth and internationalization are identified as affecting factors in this change. Providing new types of services requires

different financial control. According to the focus group discussions, “*the increasing importance of the continuous services give rise to new information needs in the finance perspective.*” (CFO 4.12.2015). The information themes and information needs related to this performance perspective are presented in Figure 23.

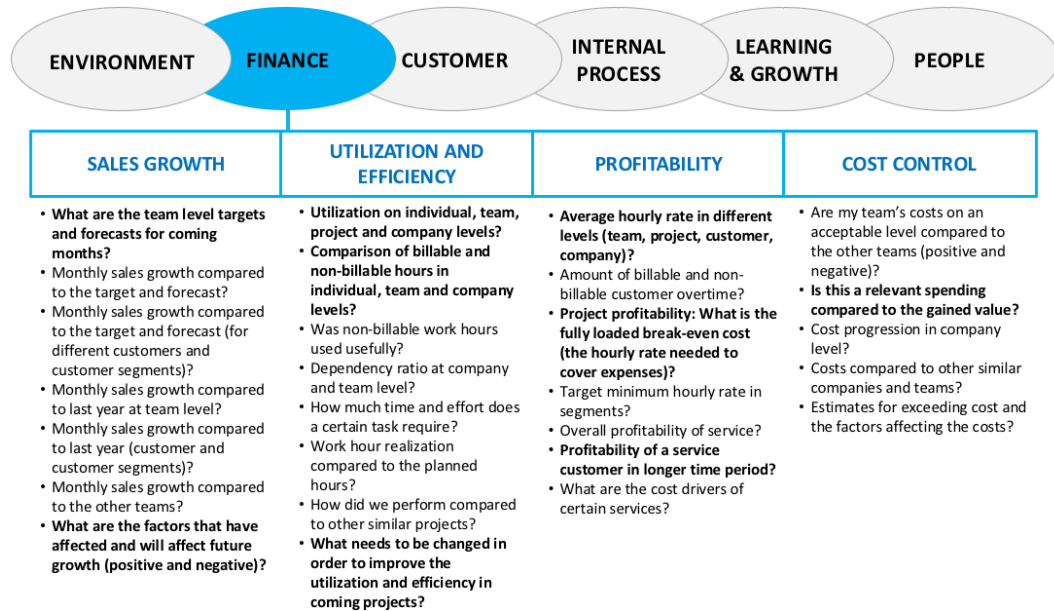


Figure 23: Managerial performance information needs: Finance.

As the information needs are reviewed from the team managers' perspective, many of the common financial information needs, such as financing, are not included. In practice, all the team managers needed information about all of the identified information themes in this perspective. Especially the information themes of utilization and efficiency and profitability were seen as important by the interviewees. At the same time, especially the information theme of cost control stimulated discussion.

Sales growth

The team managers are required to understand the financial side of business operations, for example, the aspects of sales growth and forecasting. To the team managers “*sales growth is important especially from the goal setting perspective.*” (Senior manager 8.2.2016). Despite the fact that the team managers themselves are responsible for setting these goals for the team and giving forecasts of its progress, “*these measures direct the work and help the team managers in achieving these goals as well.*” (Team manager 1.2.2016). Therefore, the information need “*What are the team level targets and forecasts for the coming months?*” was defined as important for the team managers.

Turnover as a measure describes the increase and development of sales over time. “*Turnover is an important information especially for a well-established business as it tells us weather or not we have achieved our goals.*” (Team manager 27.1.2016). For the team managers, turnover is nevertheless only one performance measure among oth-

ers. Even more important is to understand the reasons and affecting factors behind these numbers. Therefore, the most important information need in this information theme was defined to be *“What are the factors that have affected and will affect future growth (positive and negative)?”*. If these factors are known, sales growth can be improved in the long term, which is very important for the target organization’s performance.

Utilization and efficiency

In the target organization, utilization, which describes the ratio between billable and nonbillable work hours, has traditionally been an important performance measure. It is believed that if the utilization rate is high enough, the organization is performing well. As one of the interviewees described: *“In this type of business, utilization and revenue are closely linked with each other. If you know one of these two you can easily calculate the other.”* (Team manager 25.1.2016). Therefore, the most important information need in this information theme was *“Utilization on individual, team, project and company levels?”*. As defined, the team managers need to be able to review and analyze this measure on different levels.

The measure of utilization is very meaningful for the team managers. *“On the team level, utilization is a very good thermometer. In my team, when the utilization gets very high, you might not see happy faces at the office in the morning.”* (Team manager 25.1.2016). At the same time, as noticed during the interviews, *“the utilization levels that people are comfortable with are very personal. Some people are able to handle multiple projects simultaneously and some are not. And it is very often contradictory to what people describe themselves. In reality, their performance is fairly poor in these situations.”* (Team manager 25.1.2016). This is one of the reasons why it is important for the team managers to have in-depth knowledge about its team members.

Despite the importance of utilization as one of the performance measures, it is not suitable for everything. As one of the team managers stated: *“Utilization is not a meaningful measure for the comparison between teams, as some teams are providing continuous services with a lower hourly rate and other teams’ business operations are dependent on short projects where the hourly rates are much higher.”* (Team manager 25.1.2016). During multiple interviews, it was also noticed that the measure of utilization is not as meaningful for continuous services as it is for the project based professional services. Instead, the measure of *“efficiency is highlighted more on the continuous services side than in consulting business (professional services), which is nevertheless still our main business.”* (COO 30.11.2015). In continuous services, efficiency could be defined, for example, as the measure on how much effort is required to accomplish a task which is repeated for multiple customers.

Profitability

The team managers are required to have an understanding of the target organization's profitability. *"From [the target organization's] viewpoint, profitability is the most important measure of performance. Even more important than growth as we cannot grow without keeping the profitability on an adequate level."* (CFO 30.11.2015). At the same time, the target organization *"has only one profit and loss unit in use and the team-specific profitabilities are not calculated"* (Team manager 10.2.2016). This has been decided by the management team as an attempt to promote work between teams instead of siloed business operations. Nevertheless, in certain situations, this makes things more challenging as profitability is more difficult to measure. This was also discussed in the focus group session: *"Despite the fact that costs and profitability are the management team's responsibility, the team managers require a better view to these things. Nevertheless, a team level view is not necessarily practical due to the small size of the teams."* (CFO 30.11.2015).

At the moment, *"profitability is calculated with the measure of fully loaded cost where the fixed expenses are added to the salary of the consultants. A rule of thumb is that a good consultant needs to make money at least three times their own salary."* (Team manager 10.2.2016). The most important information need in this information theme was therefore defined to be *"What is the fully loaded break-even cost (the hourly rate needed to cover expenses)?"*. With the help of this measure, the team managers are able to evaluate their teams' profitability. On the other hand, the information need *"Profitability of a service customer in longer time period?"* was also defined important. This is especially important for continuous services, as the profitability of the customers are to be measured in the longer time period.

Cost control

Both sales growth and costs have an important role from the target organization's profitability viewpoint. From the team managers' perspective, the costs are challenging due to the lack of team level cost sharing, as noticed earlier. As one of the interviewees mentioned: *"The team managers are aware of the salaries of the team members but there is a great amount of other costs which are unknown."* (Senior manager 8.2.2016). Despite the fact that costs are not the team managers' primary concern, in order to keep the business operations profitable, more detailed information about the costs is needed. At the moment, especially the question *"Is this a relevant spending compared to the gained value?"* was defined important by multiple team managers. Based on this information, the consideration of the relevance of a certain spending should be a part of the team managers' everyday course of action. *"Every decision needs to be sound and bring positive outcome. This decision should not be based on a gut feeling."* (Team manager 25.1.2016). The following information need was therefore defined: *"Are my team's costs on an acceptable level compared to the other teams (positive and nega-*

tive)?”. At the same time, one of the team managers highlighted that “*even though monitoring costs is logical, if it is not implemented in the correct way, it may lead our decisions to an unfavorable direction. For example, recruiting only experienced professionals.*” (Team manager 3.2.2016).

6.4.3 Customer

The customer performance perspective describes the information needs, which are related to how the target organization perceives its customers and their needs and how customers perceive the target organization. This performance perspective is central for an organization operating in the professional service business. The information themes and information needs related to this performance perspective are presented in Figure 24.

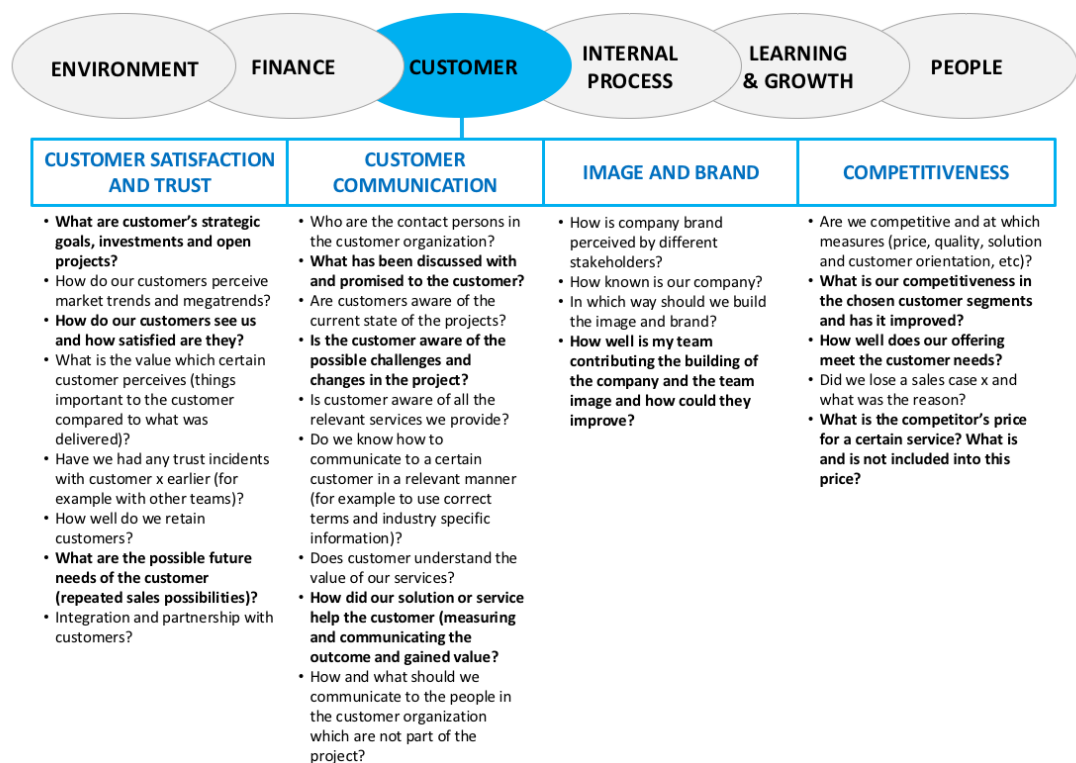


Figure 24: Managerial performance information needs: Customer.

The importance of the customer performance perspective was highlighted by all interviewees, especially because the need to understand the needs of current and potential customers. As one of the team managers mentioned, “*..it is essential to understand what the needs of our customers and customer segments are.*” (Team manager 27.1.2016). Nevertheless, “*our ability to understand these needs is very limited. Of course it depends on whether we are speaking about the business or technical needs.*” (Team manager 10.2.2016). In this performance perspective, especially the information themes of customer satisfaction and trust were highlighted by multiple interviewees.

Customer satisfaction and trust

The business area where the target organization operates is highly dependent on the trust between the customer and the service provider. *"Customer satisfaction and especially trust are important in an advisory type of business"* (COO 30.11.2015). One of the interviewees even mentioned that *"a customer will choose another company to partner with if there is a lack of trust, no matter the costs."* (Team manager 10.2.2016). Therefore, all the interviewees saw this information theme, with multiple performance information needs, as central to the target organization's performance. The information need *"How do our customers see us and how satisfied are they?"* was identified during the interviews. This information need includes both the aspect of customer satisfaction and trust. The ability to analyze this information over time was seen as important in order to satisfy the team managers' information needs.

As the target organization is continuously conducting customer satisfaction surveys, it already puts a lot of emphasis on customer satisfaction. *"We get quite a good amount of information about customer satisfaction. And if there are deviations from the normal level, it is disclosed so that the situation can be corrected."* (Team manager 25.1.2016). For now, it is still undecided in which way customer satisfaction should be measured in the continuous services. According to some of the interviewees, their own feeling or supposition about the customers' satisfaction has sometimes been completely the opposite to the real customer satisfaction.

Besides utilizing satisfaction surveys, open conversations with customers are another way to collect this type of information. As one of the team managers mentioned: *"Satisfaction and trust can be sensed in conversations with the customer. For example, it is a very good indicator if a customer openly tells about their future plans, budgets and everything."* (Team manager 10.2.2016). This type of information is also important from the sales viewpoint. The identified information need was defined to be *"What are the possible future needs of the customer (repeated sales possibilities)?"* by many of the team managers. And as was mentioned during the focus group discussions *"I am of the belief that we have big customers, some of which are inadequately exploited."* (CFO 10.12.2015). This highlights the importance of this type of information.

Customer communication

Open communication with the customer is very important in this type of business. The usual problem is that *"all relevant information does not necessarily reach all required members"* (Team manager 1.2.2016) in the customer organization or the target organization. One of the reasons is that *"sometimes we are too strongly in the mode of doing the project work instead of listening to what the customer is telling us and therefore we might lose either sales, trust or the customer satisfaction."* (COO 30.11.2015). On the other hand, *"there are great differences in how customers communicate, which is espe-*

cially dependent on the customers' organizational culture but also on the person in question." (Senior manager 8.2.2016). Because of these things, multiple interviewees highlighted the need to agree on common practices with the customer and to make sure that new consultants also act according to these practices. This is especially because *"the lack of communication will be noticed as quality problems."* (COO 30.11.2015). Therefore, especially the information needs *"What has been discussed with and promised to the customer?"* and *"Is the customer aware of the possible challenges and changes in the project?"* were seen as important from the team managers' point of view.

Besides measuring customer satisfaction, one of the team managers highlighted the need to actively promote the value of their work to the customer. This type of communication is important, as many times the customer might not be an expert in this field and might therefore have difficulties in understanding the value they have received. The information need was defined into the following format: *"How did our solution or service help the customer (measuring and communicating the outcome and gained value)?"*. Besides the members of the project team, the whole customer organization should also be reached. For this reason, the following information need was defined: *"How and what should we communicate to the people in the customer organization which are not part of the project?"*.

Image and brand

Unlike the other information themes in the customer perspective, image and brand were not seen as important from the team managers' perspective. This is mostly because these aspects are mainly the responsibility of the marketing team. As one of the interviewees mentioned: *"Image and brand related things are not relevant for me."* (Team manager 25.1.2016). On the other hand, some of the interviewees defined a need for this type of information. According to one of the interviewees, *"if the company brand weakens for some reason, people will notice it and we need to find new methods for employee engagement."* (Team manager 3.2.2016). Especially the question *"How well is my team contributing the building of the company and the team image and how could they improve?"* was seen as something that the team managers should be aware of.

Competitiveness

Competitiveness is important for all organizations. In order to compete with other service providers, knowledge about their services and price level is needed. The team managers' information need was therefore defined as *"What is the competitor's price for a certain service? What is and is not included into this price?"*. For the team managers perspective, especially the information need *"What is our competitiveness in the chosen customer segments and has it improved?"* was found important. Information about the target organization's competitiveness and its change is received by analyzing the ten-

ders. *“In public tenders, it is easy to analyze the reasons why we have lost a certain sales case. Nevertheless, for private sector tenders these reasons are sometimes unknown.”* (COO 30.11.2015). As one of the team managers defined: *“To my knowledge, we do not analyze the reasons why we have lost a certain sales case or at least this information is not refined further into a needed format.”* (Team manager 25.1.2016).

6.4.4 Internal process

The performance perspective of the internal process describes the team managers' information needs related to the target organization's daily business operations. These processes have an important role from the target organization's performance viewpoint. As one of the team managers described, *“if these processes are done right, the outcomes can be seen as an increase in customer satisfaction and financial results”* (Team manager 1.2.2016), both of which are central measures of the target organization's performance. The identified information themes and information needs related to this performance perspective are listed in Figure 25.

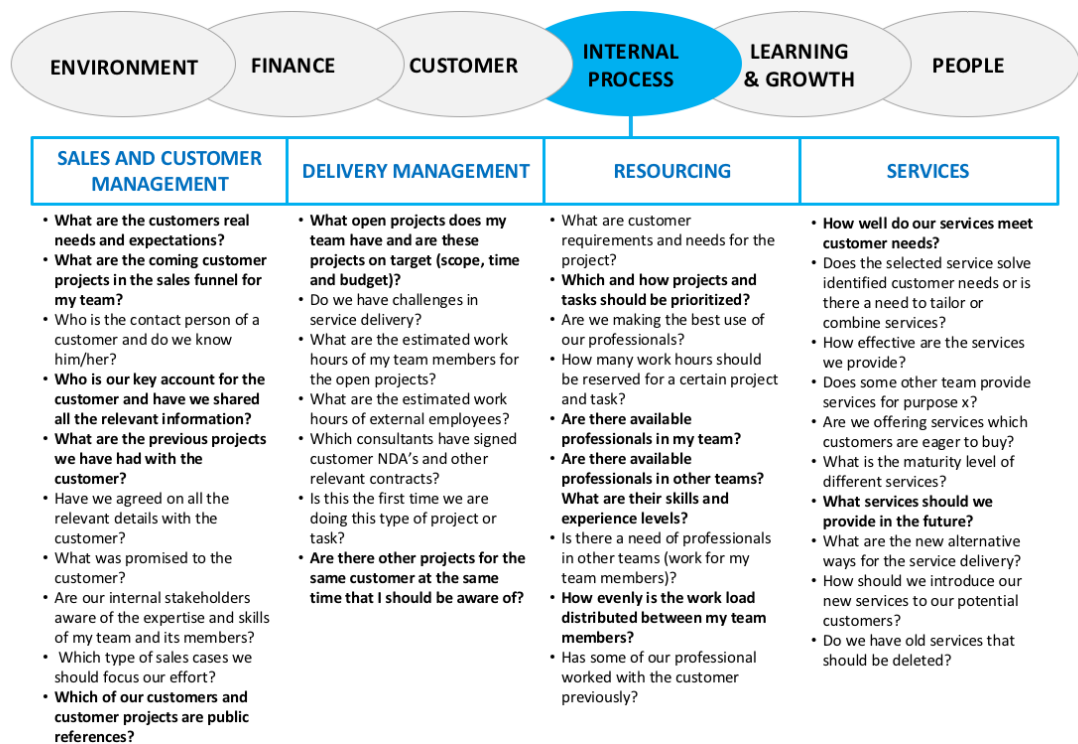


Figure 25: Managerial performance information needs: Internal process.

As the target organization's business operations and provided services are different between the teams, there are also differences between the team managers' information needs. Despite the fact that the target organization utilizes professional sales in their operations, sales and customer management are still very important information themes for team managers. In addition, especially the information needs related to delivery management and resourcing were highlighted in multiple interviews. As the business pro-

cesses in service business are highly dependent on the provided services, the information theme of services was also seen important. Due to the future orientation, it *"also identifies the elements of the teams' strategy by answering the question what services the team will provide tomorrow and the next day?"* (COO 4.12.2015).

Sales and customer management

In sales and customer management, it is important to understand the customers' needs as these needs affect the target organization's business operations in multiple ways. Therefore, the information need *"What are the customers' real needs and expectations?"* was defined as central for the team managers and the whole target organization. The team managers take part in the sales process by contacting customers, identifying customers' needs and by participating in the preparation of the tenders. According to one of the interviewees, the team manager's role in the sales is rather meaningful: *"Because most of the provided services are not highly productized, none of the big projects for my team are sold without my involvement in the sales process."* (Team manager 10.2.2016). The cooperation between the team manager and the sales team member is therefore very important. For this reason, the following information needs were defined *"Who is our key account for the customer and have we shared all the relevant information?"* and *"Have we agreed on all the relevant details with the customer?"*.

Another important information need in this information theme is *"What are the coming customer projects in the sales funnel form my team?"*. This information need, which is also related to delivery management, directs the work of the team managers and the whole team. For coming customer projects, the team managers need to know the customer, what type of work the coming project includes, estimations of the work amount as well as the probability of this sales case and the estimated start date. This information is used by the team managers, for work planning and resourcing, for example.

Delivery management

Delivery management is a central activity in a professional service business and a responsibility of the team manager. The aim of these processes is that as a result, customers needs and expectations are satisfied with adequate efficiency. For the team managers, a central information need was defined to be *"What open projects does my team have and are these projects on target (scope, time and budget)?"*. And as one of the team managers pointed out: *"I am mostly interested in if there are problems in the delivery which require my attention."* (Team manager 10.2.2016). The information need *"Do we have challenges in service delivery?"* was therefore defined.

Delivery management is highly affected by the teams' business operations and the provided services. For this reason, great differences were noticed between the teams providing professional services and continuous services. At the same time as for delivery management in the continuous services is very important information theme in other

type of service delivery its importance is much minor. As one of the team manager described: *“For my team, delivery management is not so complicated or an important aspect because our projects are shorter and therefore more straightforward.”* (Team manager 25.1.2016).

Delivery management is about to change due to internationalization. In the near future, international cooperation will be a common practice in the target organization’s service delivery. Therefore, *“all internal processes should be tuned in a way that effectively supports the cooperation between multiple country organizations”* (CFO 23.2.2016). Even at this moment, the collaboration between different teams is very important. The team managers are required to be aware of what projects the other teams are conducting and what is happening in the customer organizations. For this reason the information need *“Are there other projects for the same customer at the same time that I should be aware of?”* was defined.

Resourcing

The team managers are responsible for the effective use of resources in their teams’ operations. A central information need of the team managers concerning resourcing is therefore *“Are there available professionals in my team?”*. For team managers, it is also important to be aware of the resources of other teams, because many times projects are conducted with the members of multiple teams and skills profiles. Therefore, the information need *“Are there available professionals in other teams? What are their skills and experience levels?”* is in a central position.

According to one of the interviewees, *“the most challenging part is resourcing between the teams.”* (Team manager 25.1.2016). Despite the challenges, many teams have continuous co-operation which improves the situation. Projects between teams are also important from the learning and knowledge sharing perspectives. As one of the interviewees described: *“It is also [the target organization’s] strength as an employer that its employees are not forced to do only one type of tasks.”* (Team manager 3.2.2016).

There are many ways in which higher utilization levels can be achieved, which also means a greater amount of billable hours for the target organization. As one of the team managers mentioned *“The primary logic [for consultants] is that if you do not have your own project, you can check if your colleague has work for you in their projects. If not, there is a great amount of internal development projects available.”* (Team manager 25.1.2016). Very often, experienced consultants are more self-directed to seek projects for themselves. For the team managers, it is very important to be aware of the workload of the team members, and therefore the following information need was defined: *“How evenly is the work load distributed between my team members?”*.

Services

The team managers are responsible for service development, which is dependent on multiple other information themes identified in the BPM framework, such as the market and clients as well as employee skills and experience. As one of the team managers mentioned during the interview: *“It is the team managers’ responsibility that customers are eager to buy the services we provide. Therefore I am trying to be as close to the customers as possible, so that I personally understand their needs as these needs are continuously changing. Services are then adapted based on these needs.”* (Team manager 10.2.2016). Another interviewee stated that *“three things are highly linked to each other: 1. customer needs 2. skills and recruitment 3. services.”* (Team manager 25.1.2016). For this reason, the information need *“How well do our services meet customer needs?”* was defined. In addition, there should be needed skills to provide these services which is recognized in the learning and growth perspective.

6.4.5 Learning and growth

The performance perspective of learning and growth is important for the target organization because it has substantial objectives for profitable growth. In the professional service business, growth is highly dependent on the employees and their competence, which highlights the importance of this performance perspective. As one of the team managers described, *“[the target organization’s] entire business operations are dependent on our professionals and their know-how”* (Team manager 10.2.2016). The identified information themes and information needs related to this performance perspective are listed in Figure 26.

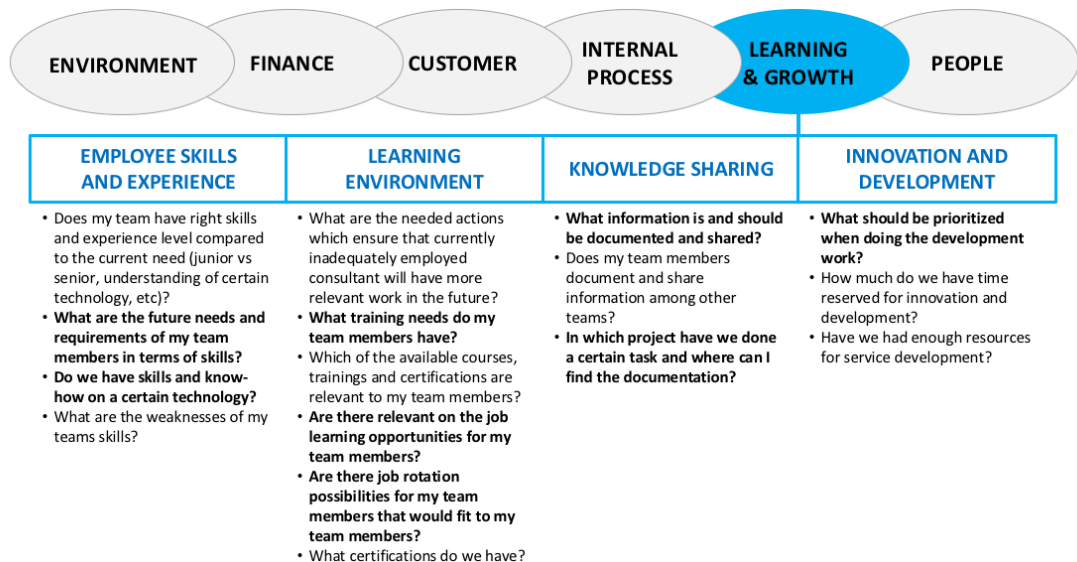


Figure 26: Managerial performance information needs: Learning and growth.

According to multiple team managers, especially the information themes of employee skills and experience as well as the learning environment were defined as important. On the other hand, deficiencies in knowledge sharing was often mentioned as an area affecting the target organization's performance. Despite the few identified information needs in the innovation and development information theme, this theme was also seen as important to the target organization.

Employee skills and experience

The most important information need in this performance perspective was defined to be *"What are the future needs and requirements of my team members in terms of skills?"*. This information need is highly dependent on customer needs and requirements, which makes answering this question more difficult. At the same time, *"the challenge in this area is that the skills of individuals are not something you can understand by looking at a list of people."* (COO 10.12.2015). Therefore, there is a need for a deeper and more personal knowledge concerning these skills. Nevertheless, *"it has proven to be very difficult to maintain a database on these things especially because people value their skills and competency in very different ways. This is probably one of those issues which will never be solved."* (Team manager 25.1.2016). For the team managers, a typical situation is that certain skills are needed for a customer project, for example, related to a certain technology. Therefore, multiple team managers defined the information need *"Do we have skills and know-how on a certain technology?"* rather important.

Learning environment

The information theme of the learning environment has a central part in professional service organizations, as the provided services are highly dependent on the skills and competence of employees. Professional development in this context is therefore very important. As one of the interviewees described: *"Shared projects between people from multiple teams is the only way to bring out and enhance knowledge transfer and learning."* (Team manager 3.2.2016). For this reason, especially relevant on the job learning opportunities are very important in the target organization. The following information need was therefore defined: *"Are there relevant on the job learning opportunities for my team members?"*. A typical situation is that a junior consultant is put to work with a more experienced consultant. And as one of the team managers mentioned: *"Our strength as a company is that we have a great bunch of talented people working who are also eager to teach others."* (Team manager 10.2.2016).

Despite the *"differences in the speed of learning between individuals, it is very seldom that anyone would like to stay at their current level."* (Senior manager 8.2.2016). The following information need was therefore defined: *"What training needs do my team members have?"*. The importance of taking into account people's own desires to learn is also important. *"At the same time as we need to know what skills people have, it is*

also very important to understand people's desires to do and learn new things." (Team manager 8.2.2016).

Knowledge sharing

Many of the interviewees identified knowledge sharing as a challenge for the target organization and mentioned reusing information challenging, especially between different teams. The following information need was therefore defined: *"In which project have we done a certain task and where can I find the documentation?"*. At the same time, knowledge sharing and open communication between the members of the target organization was seen to increase its importance due to the internationalization and growth. Both cultural as well as technological challenges were identified as a root cause of these challenges. As one of the interviewees mentioned: *"What makes knowledge sharing difficult in [the target organization] is that different people do different things with different backgrounds."* (Team manager 10.2.2016). What this means is that the professionals have expertise from different areas and therefore require very different types of information to support their work. Besides, *"many of our consultants spend long periods of time at the customer's facilities separated from their colleagues."* (Team manager 10.2.2016), which is a challenge from the knowledge sharing viewpoint. Therefore, the information need *"What information is and should be documented and shared?"* was seen as important.

Innovation and development

The information theme of innovation and development ensures that the target organization is capable of adapting to the changes in the business environment and customers needs. The information need *"What should be prioritized when doing the development work?"* was therefore defined important for the team managers. Unsufficient innovation and development work will affect the target organization's performance significantly in the long term. Therefore, as one of the interviewees mentioned, *"it is very dangerous to forget this part because of the continuous rush."* (Senior manager 8.2.2016). Besides, *"this type of work is also a great way to motivate people, as people are very excited when they are given the opportunity to develop something new."* (Senior manager 8.2.2016).

6.4.6 People

The last of the six performance perspectives recognized in the target organization's BPM framework is the people. This performance perspective examines the target organization's professionals from a personal leadership viewpoint and acknowledges the information needs related to the different steps of the employment lifecycle and management. The identified information themes and information needs related to this performance perspective are listed in Figure 27.

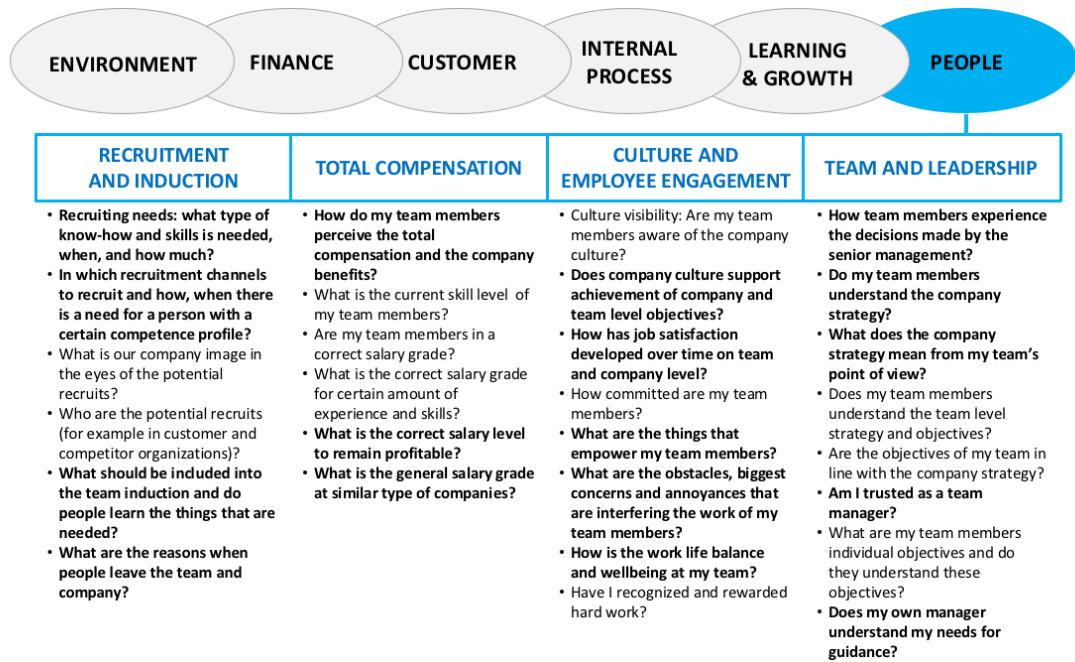


Figure 27: Managerial performance information needs: People.

The information needs in the people perspective were discussed in all of the interviews, and many of the team managers highlighted the importance of this perspective for the target organization's performance viewpoint. Especially the information themes of recruitment and induction as well as culture and employee engagement were seen as important for the team managers.

Recruitment and induction

The target organization is operating in a business area where there is a great demand for experienced professionals as this business is continuously growing. And as one of the interviewees mentioned, the *"challenges in recruitment affect [the target organization's] scalability and growth."* (Team manager 25.1.2016). For this reason, the information need *"Recruiting needs: what type of know-how and skills is needed and how much?"* is in a central position for the team managers. Multiple interviewees highlighted the importance of identifying the recruitment need well in advance, so that the organization would have time to react according to these needs. Especially the need for better forecasts concerning the increase of demand in certain business areas was seen as important from the team managers viewpoint. *"At the moment, upfront recruitment is done mostly based on a gut feeling about the market growth. Therefore, it is more about luck whether this recruitment is targeted for the right team and competence profile."* (Team manager 25.1.2016). Especially the sales team members were identified as an important information source for this type of information.

In addition to the target organization's people operations team, which is responsible for recruitment, the team managers have a central role in this process. Central to these acti-

vities is that they are targeted to the correct recruitment channels. Therefore, the following information need was defined as important: *"In which recruitments channels to recruit and how, when there is a need for a person with a certain competence profile?"*. As acknowledged during the interviews, the correct recruitment channel is especially dependent on the needed competence.

Besides recruitment, the induction of new employees is also a fairly important task of the team managers. *"Throwing the new employees into the cold water to find out whether they can swim or not is not according to this company's interest."* (CFO 30.11.2015). Therefore, the following information need was identified: *"What should be included into the team induction and do people learn the things that are needed?"*. As noticed, besides introducing the right things, there is also the need to ensure that the induction has been implemented successfully.

Total compensation

The total compensation is a very broad topic including a great amount of information needs. From the team managers' perspective, it is very important to be aware of how the team members perceive the compensation. As one of the interviewees mentioned: *"Salary is not the only aspect to think about. For many people, learning new things and the ability to do cool stuff are at least as important as money."* (Team manager 10.2.2016). According to another interviewee, *"especially our flexible working methods can be included into the total compensation."* (Senior manager 8.2.2016). For this reason, the most important information need for the team managers in this information theme was defined to be *"How do my team members perceive the total compensation and the company benefits?"*.

Compensation is linked to the target organization's competitiveness, which is to be defined on the company level rather than on the team level. *"Understanding our compensation and competitiveness against competitors is a central information need in our performance management."* (CFO 30.11.2015). The team managers' information need was therefore defined into the following format: *"What is the correct salary level to remain profitable?"*

Culture and employee engagement

Culture and employee engagement are both very important aspects of performance, especially when reviewed in the long-term. The target organization has attempted to increase employee engagement with clear responsibility areas and feedback. Nevertheless, as one of the team managers stated, *"at the moment, we are lacking general information about employee satisfaction and its change. Therefore we mostly need to rely on a gut feeling about satisfaction and engagement."* (Team manager 25.1.2016). This is mainly because the employee satisfaction is measured only once a year. The most im-

portant information need in this information theme was therefore defined to be: *"How has job satisfaction developed over time on team and company level?"*.

"As long as the team is small, it is rather easy to keep up with employee engagement." (Team manager 10.2.2016). Nevertheless, as a part of the target organization's growth and internationalization, the need for formal methods is increasing. According to one of the interviewees, *"when there is a noticeable change in satisfaction, for the team manager it is especially important to know if this change is a result of some factor within the team or just a general change in feeling and if this is somewhat different in my team than in others"* (Team manager 25.1.2016). This highlights the need for the team managers to be aware of the overall employee satisfaction and engagement within the target organization to enable a comparison of the team results with the overall average results. Besides, *"if these surveys are conducted often enough it is fairly easy to deduce what the things affecting the results are."* (Team manager 25.1.2016).

Team and leadership

The team managers are required to be aware of the target organization's strategy, so that they are able promote it with their own actions. The information need *"What does the company strategy mean from my team's point of view?"* is therefore important to understand. In addition, from the leadership point of view, it is the team managers' tasks to make sure that the team members understand and act according to the strategy. Therefore, the information need *"Do my team members understand the company strategy?"* was defined. At the same time, the team managers' role is to intermediate the senior management's message to the team members. The following information need is therefore important to understand: *"How do my team members experience the decisions made by the senior management?"*. Both of these aspects are related to trustworthiness, which is very important for the target organization's business operations.

Leadership requires open communication between the team managers and the team members. This is one of the reasons why direct communication has been promoted in the target organization's working methods. Besides collecting information with the help of employee satisfaction surveys, *"one-to-one conversations between team managers and team members are often utilized to gain a deeper understanding"* (Senior manager 8.2.2016) about current topics. The team managers require feedback from the team members on how they have succeeded in their work. For this reason, the following information need was defined: *"Am I trusted as a team manager?"*. In the same way, the team managers themselves also need support in their work. The information need *"Does my own manager understand my need for guidance?"* is therefore as important for the team managers as it is for the team members as well.

6.5 Satisfying the team managers' information needs

As a part of the business intelligence current state assessment, the identified performance information needs are compared with the business information at the team managers' disposal. The gap between these two describes the target organization's ability to satisfy the team managers' performance information needs with the BI capabilities. These capabilities, in relation to the BPM framework and the identified performance information needs, are described in Figure 28. The uppermost ellipses and their coverage represent how well the different BI tools meet these needs. This figure generalizes the findings of the BI current state assessment and gives an overall view of the BI capabilities in relation to the performance information needs without describing the individual information needs or the integrations between the systems.

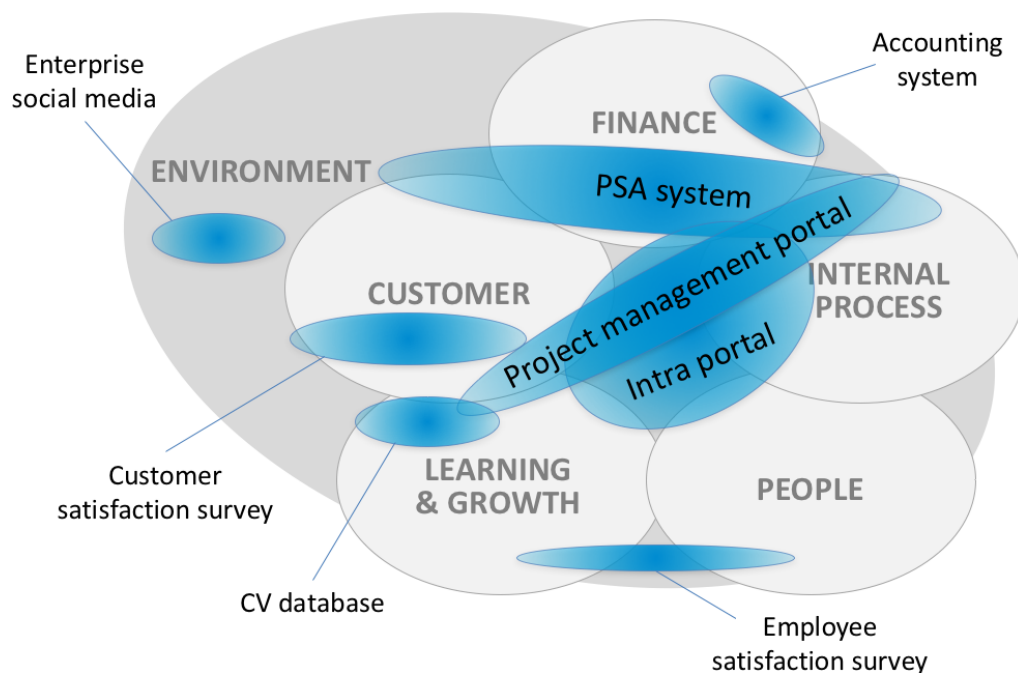


Figure 28: The target organization's current BI tools in relation to the BPM framework and the identified information needs.

The current BI activities of the target organization are predominantly focused on providing information on the performance perspectives of finance, customer and internal process. The team managers' information needs are satisfied with the performance information produced, processed and disseminated with multiple information systems, tools and processes used by the target organization. In these performance perspectives, especially the PSA system, accounting system, project management portal and intranet portal are utilized to satisfy the needs. Nonetheless, as one may notice, only a limited part of the needs in these performance perspectives can be satisfied with the target organization's BI. As mentioned earlier, organizations rarely struggle with a lack of information, but the lack of needed information is a very common issue in many organizations.

The greatest challenges in meeting the team managers' information needs occur especially in the performance perspectives of environment, learning and growth and people. A great amount of the identified performance information needs in these perspectives are inadequately supported and therefore problematic from the team managers' perspective. Currently, the team managers information needs in these performance perspectives are supported by enterprise social media, a CV database system and an intranet portal in addition to the surveys concerning customer and employee satisfaction. The main constraint in satisfying the needs is the inadequacy of the needed information. The target organization lack of information system support especially concerning the learning and growth and people perspectives, which are in many organizations supported with human resource management (HRM) system.

As noticed in the theoretical part of this study, the common challenges in satisfying information needs are the shortage of time, lack of training, unavailable access to relevant information and information overload (Nicholas & Martin 1997, p. 49). These same challenges were noticed to affect the target organization's capabilities in satisfying the team managers' information needs and in this way also their managerial tasks, such as decision-making. Due to the lack of the team managers' induction and training, the use of different BI tools requires a greater effort and learning from the managers themselves. In addition to this, the team managers' work is often affected by a shortage of time which on the other hand affects the use of information. Especially information which is not provided in the correct format might not be used even if the need for information exists: *"It all comes down to the usability of the information systems as well as the information itself. If the information is not in a needed format, this information is very easily left unused as the team managers always have something more important to do than educating themselves on how to use the systems."* (Team manager 3.2.2016). Besides the need for introduction and training, this also highlights the need for a continuous support of the team managers. And as noticed, the shortage of time and the lack of training also intensify each other.

Information overload was noticed to affect managerial activities, which is more about the quality of information than the quantity of information. Especially the format of the provided business information, for example the PSA system reports, was noticed to have challenges in satisfying the information needs. The PSA system provides a great amount of reports, which are mainly designed by the information system provider but not created to satisfy a certain information need. These reports are also affected by the constraints of the system, for example the end users have very limited possibilities in tailoring these reports for themselves while using the system. It is not enough that the needed information is at the team managers' disposal even if they are motivated to satisfy their own needs. Providing information in an incorrect format was seen as a waste of the team managers' valuable time by one of the interviewed managers: *"When there is a real need for information the team manager is willing to dig up this information*

even though it might require some additional effort and might not be available in an optimal format. Nevertheless, we should encourage the use of information by providing it to our managers in a usable format.” (Team manager 3.2.2016). This is especially important because the value of information is reached only when the information is used.

As noticed, the challenges in satisfying the identified information needs are caused by either the lack of information system support or alternatively, deficiencies in the current information systems, tools or processes. In addition, in many cases information from multiple information sources is needed in order to satisfy the identified information needs. This is challenging for the target organization as it lacks in its capability in gathering and aggregating information from multiple information sources, which is often enabled by utilizing data warehousing. Next, the challenges related to the different performance perspectives are introduced by reviewing each performance perspective one by one.

Environment

In the environment performance perspective, especially the enterprise social media portal, intranet portal and PSA system are used to satisfy the team managers’ information needs. Nonetheless, as noticed earlier, the target organization has challenges in meeting the team managers’ needs with its current capabilities. The challenges in satisfying the team managers’ performance information needs with the current BI tools related to the environment performance perspective are highlighted in Table 4. These challenges are related to, for example, the challenges in the market and competitive intelligence, information quality and co-operation between the members of the target organization.

Table 4: *Environment: BI tools and challenges in meeting the information needs.*

ENVIRONMENT	BI tools	Challenges in satisfying the information needs
	<ul style="list-style-type: none"> • Enterprise social media • Intra portal • PSA system 	<ul style="list-style-type: none"> • Lack of information concerning the Finnish market due to the industry-specific issues such as market size • Challenges with information quality and consistency • Limited capabilities and resources for competitor and market analysis • Challenges in co-operation and information exchange between the team managers, senior managers and sales team members • This performance perspective is not in the main focus of the current BI activities

The business environment is especially challenging for organizations, because in addition to tracking the competitors and customers, there is also a need to monitor a great amount of other aspects, such as economic trends, international trade, lifestyle changes, technological innovations and government policies (Choo 2002, p. 30). The target organization is affected by some of the industry-specific issues especially concerning the environment performance perspective. The target organization operates in a market which is relatively small in Finland and therefore general statistical information about

the domestic market is unavailable. On the other hand, the information about the market on a European and global scale is increasing its relevancy due to the internationalization and growth of the target organization.

On the other hand, there are also challenges in the knowledge sharing related to this performance perspective, besides the challenges in acquiring this type of information: *“The information that senior managers, lead consultants and sales team members get is not effectively shared with the other members of the organization.”* (Team manager 3.2.2016). The team managers visibility in the target organization is often limited to their team’s customer projects, which go very deep into a certain speciality area but at the same time do not provide a comprehensive view of the market and trends.

Finance

In the target organization, the main BI systems used to provide the performance information in the finance performance perspective are the PSA system, accounting system and intranet portal. The challenges in satisfying the identified information needs are related to the PSA system and the information quality issues (Table 5).

Table 5: Finance: BI tools and challenges in meeting the information needs.

	BI tools	Challenges in satisfying the information needs
FINANCE	<ul style="list-style-type: none"> • PSA system • Accounting system • Excel files 	<ul style="list-style-type: none"> • Tailoring of the PSA system still on-going • PSA system constraints interfere reporting and business operations • Reports do not satisfy the team managers’ information needs • Team level costs and profitability are unknown • Lack of adequate reports for teams providing continuous services • Reporting requires manual data gathering and maintenance • Team managers lack of awareness of available information due to the inadequate induction and training • Information at the team managers’ disposal is not processed enough to meet their needs

Many of the interviewees mentioned that a great amount of the business information provided with the target organization’s BI, especially with the PSA system, is not in the correct format to satisfy their needs. One of the team managers even stated that *“none of the current views or reports [in the PSA system] are useful for me. There are too many options to choose from and none really meet my needs.”* (Team manager 10.2.2016). Besides these issues, also the lack of needed information and the team managers’ awareness of available information was noticed to have an effect on the target organizations’ capabilities in satisfying the needs.

Customer

In the customer performance perspective, especially the customer satisfaction survey and the project management portal, was seen to have an important role in providing the

needed information to the team managers. The customer satisfaction survey results describe the target organization's abilities in satisfying customer needs, which is a central measure for a company operating in the professional service business. In this performance perspective, the challenges in satisfying the identified information needs are related to the differing needs between the team managers, the challenges in measuring customer satisfaction as well as the challenges in internal and external communication (Table 6).

Table 6: *Customer: BI tools and challenges in meeting the information needs.*

	BI tools	Challenges in satisfying the information needs
CUSTOMERS	<ul style="list-style-type: none"> • Customer satisfaction survey • Project management portal 	<ul style="list-style-type: none"> • Differing needs between the team managers • No dedicated way to measure customer satisfaction of continuous services • Project management portal is inadequately utilized in customer communication • Challenges in co-operation and information exchange between the team managers, senior managers and sales team members

The target organization collects customer satisfaction from each customer project by utilizing an online survey at the end of the project. This information is shared with the team managers once it is received. Nonetheless, this information is not provided to the managers in a format that would satisfy their needs, nor do the current tools provide advanced capabilities for data analysis: *"We should have capabilities in analyzing this data on a whole different level. For example, visualizations of the data and the ability to drill down so that you could find the real reasons for the results."* (Team manager 1.2.2016). Besides this established practice, customer satisfaction is also observed as a part of the informal communication with the customer, for example during steering group meetings. This informal information collection is especially highlighted in regard to the continuous services. This is especially important as the formal methods in providing this information in continuous services are still undetermined.

Internal process

The performance perspective of the internal process is supported with the PSA system, project management portal and intranet portal. Similarly to the finance perspective, the identified information needs are affected by both the constraints of the PSA system as well as the data quality issues related to this system. The challenges in satisfying the information needs in the internal process performance perspective are described in Table 7.

Table 7: *Internal process: BI tools and challenges in meeting the information needs.*

INTERNAL PROCESS	BI tools	Challenges in satisfying the information needs
	<ul style="list-style-type: none"> • PSA system • Project management portal • Intra portal 	<ul style="list-style-type: none"> • PSA system constraints interfere reporting and business operations • Challenges with information quality and consistency • Tailoring of the PSA system is still on-going • Differing needs between the teams (project based vs continuous services) • Inadequate know-how due to lack of induction and training • Lack of consistent and clear picture of the company for the managers

Multiple team managers mentioned that there is a lack of a consistent and clear picture of the other team's projects in the target organization. As one of the team managers described the situation: *"The common problem for the team managers is to see the forest form the trees."* (Team manager 10.2.2016). Due to the lack of this type of information, for example resourcing between the teams is more challenging to conduct.

Learning and growth

The information needs in the performance perspective of learning and growth are mostly satisfied with the CV database, intranet portal and especially with the information collected by utilizing an employee satisfaction survey. As the name indicates, the CV database is a system which is used for maintaining and sharing information about the consultants' skills and professional development. This system satisfies some information needs but not very comprehensively due to its deficient use and the constraints of the system. The challenges in satisfying the information needs concerning the learning and growth performance perspective are presented in Table 8.

Table 8: *Learning & Growth: BI tools and challenges in meeting the information needs.*

LEARNING & GROWTH	BI tools	Challenges in satisfying the information needs
	<ul style="list-style-type: none"> • Employee satisfaction survey • CV database • Intra portal 	<ul style="list-style-type: none"> • Employee satisfaction survey is conducted only once a year • Competency management is inefficiently supported • Inadequate knowledge sharing • Deficient use of CV database • This performance perspective is not in the main focus of the current BI activities

The learning and growth performance perspective is not the main focus of the target organization's current BI activities in spite of its rather substantial growth targets. As noticed earlier, especially the lack of an information system support affects the target organization's capabilities. At the same time, information about employee satisfaction has been collected and used by the managers for many years. Nevertheless, this survey is conducted only once a year, which is not often enough according to multiple interviewed team managers. Usually an external service provider has conducted this study and analyzed the results in comparison to the previous years.

People

The people performance perspective is highly related to the learning and growth perspective and therefore also the BI tools used to satisfy these needs are similar. Especially the employee satisfaction survey and intranet portal are used to support the team managers' work. The main challenge in satisfying the team managers' information needs in this performance perspective is related to the inadequately supported recruitment process and practices (Table 9).

Table 9: *People: BI tools and challenges in meeting the information needs.*

	BI tools	Challenges in satisfying the information needs
PEOPLE	<ul style="list-style-type: none"> • Employee satisfaction survey • Intra portal 	<ul style="list-style-type: none"> • Employee satisfaction survey is conducted only once a year • Recruitment is insufficiently supported • This performance perspective is not in the main focus of the current BI activities

The main challenge in satisfying the needs of the team managers is related to the target organization's inadequate capabilities in supporting the recruitment process. This is especially challenging as the target organization is operating in a business area which suffers from a shortage of specialists. Furthermore, the target organization's growth is highly dependent on this process which highlights the need for a better support for these activities.

7. DISCUSSION OF THE FINDINGS

Chapter 7 describes the main conclusions of the study by answering the twofold research question. Three action recommendations are also given to the target organization based on the study results. At the end of this chapter, an assessment on how well the research succeeded is introduced and future research topics are suggested.

7.1 Conclusion

The main objective of this study was to identify and describe the team managers' information needs in the area of business performance management. The secondary objective was to define the requirements for the target organization's BI development by comparing the team managers' information needs and the current information offering. In order to achieve these objectives, a twofold research question was defined. This research question can be answered by linking the findings from the focus group discussions and the semi-structured interviews to the research literature.

The first part of the research question: *What information needs do team managers have in the area of business performance management?*

The team managers' performance information needs were studied by conducting an information need assessment. This process began with the planning of the assessment, followed by the gathering and analysis of the information and ended with the reporting of the findings. As this assessment was focused on studying the team managers' information needs in the area of business performance management, it was seen necessary to utilize a framework which identifies the different aspects of performance in a holistic manner and this way enable a comprehensive review of the performance information needs. For this reason, the BPM framework for the use of an SME operating in service business was developed and then adapted into the target organization's use.

The findings of the information need assessment are described with the help of the target organization's BPM framework (Figure 30). The team managers' performance information needs are described with a three level categorization: performance perspective, information theme and information need. In this categorization, performance is first divided into the six performance perspectives of environment, finance, customer, internal process, learning and growth and people. Underneath these perspectives are 25 information themes which are defined based on the identified performance information needs. Together, these performance perspectives and information themes summarize the team managers' performance information needs.

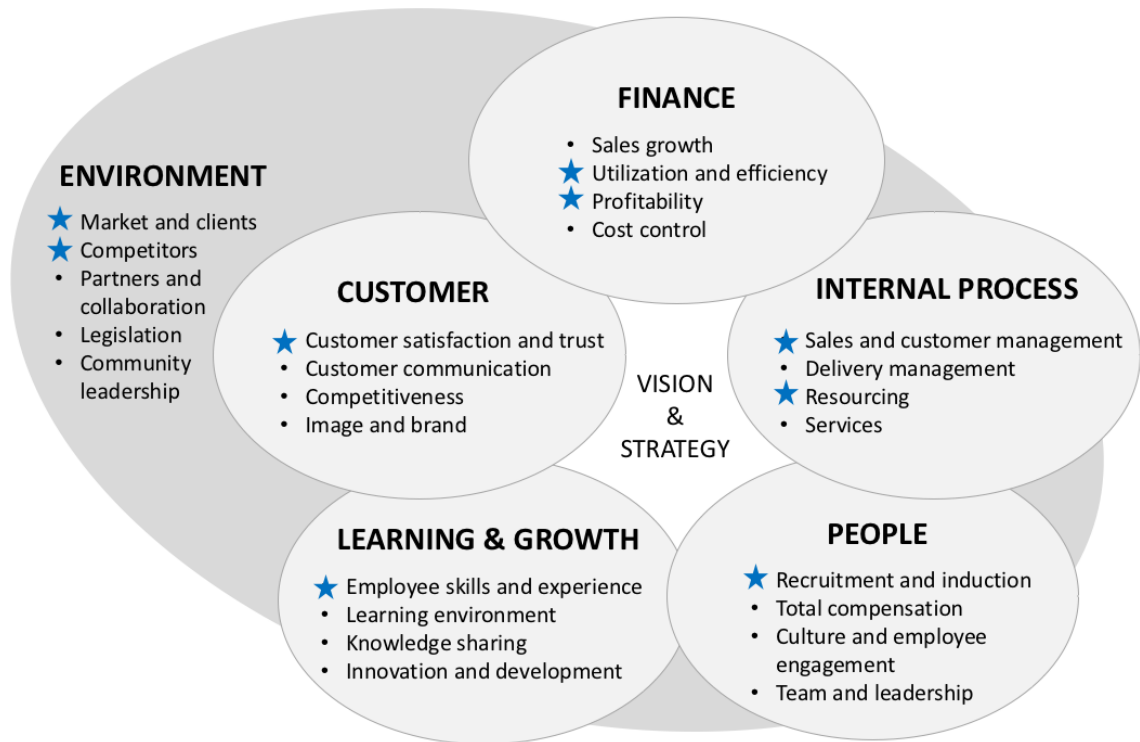


Figure 30: The target organization's BPM framework: six performance perspectives and identified information themes.

The team managers have various information needs in all of the performance perspectives. Altogether, 173 information needs were identified during the study. These information needs were introduced in Chapter 6.4. by reviewing one of the six performance perspectives at a time. Many of the identified information needs could be divided into smaller parts. For example, the information need “Which companies are our most relevant competitors?” could be seen as consisting of multiple sub questions like “What is the turnover of the competitor?” and “What services does this competitor provide?”. In this study, it was chosen not to do so as it would have divided the identified information needs into too small parts and made the assessment of these needs more challenging and time-consuming. An exception were the information needs in the finance performance perspective, which are more precisely defined due to their quantitative nature.

All interviewed team managers recognized a need for performance information. These information needs are mostly generic in nature and in this way applicable to other companies as well. Nonetheless, information needs specific to the target organization are included as well, such as community leadership, which is also defined in the target organization's strategy and therefore seen as important by the team managers as well. As defined in the theoretical part of this study, BPM has traditionally concentrated on historically oriented financial measures, which is understandable as they are important for all organizations. Despite this, the target organization's team managers' information needs are related to both financial and non-financial as well as qualitative and quantitative performance measures.

Besides identifying the information needs, the objective of the assessment was to prioritize the information needs. There were no major differences between how important the different performance perspectives identified in the target organization's BPM framework were seen by the team managers. This does not mean that all the identified performance information needs would be equally important. Not all tasks and decisions of the team managers are critical, and for this reason neither are all the identified information needs. The most important information themes, which multiple team managers highlighted during the interviews, are marked with a star (Figure 30). In the environment and customer performance perspectives, the information themes of market and clients, competitors as well as customer satisfaction and trust were especially important. Other information themes defined as important are utilization and efficiency, profitability, sales and customer management, resourcing, employee skills and experience as well as recruitment and induction, which are more closely related to the target organization's internal business operations.

A holistic performance assessment is needed when analyzing information needs, as there are interdependencies between the performance information needs in different performance perspectives. In the same way as the performance measures should not be isolated and interpreted individually, the interdependency is prominent for the performance information needs as well. What this means in practice is that very often the identified performance information needs are somehow connected to each other. For example, there are interdependencies between the information themes of resourcing and employee skills and experiences. In order for the team manager to do a resourcing related decision, both questions "*Are there available professionals in my team?*" and "*Do we have skills and know-how on certain technology?*" first need to be answered.

The cube of business information introduced by Hannula & Pirttimäki (2005) identifies three aspects of information: subject, source and type, which can be used when characterizing the information needs. Many team managers described their information needs by unknowingly defining the different aspect of information, although this was not systematic nor did they use the exact same terms. Especially the information subject and type was defined by multiple team managers, whereas a smaller percentage of the interviewees expressed their opinion concerning the information source. Nonetheless, in many cases, the information subject itself defines the possible information sources.

In the target organization, both internal and external information subjects were defined as important by the team managers, as noticed in the target organization's BPM framework. The performance perspectives of environment and customer are mostly linked to external information subjects, whereas the rest of the performance perspectives are more about internal information subjects. Based on the identified performance information needs, the team managers need information from both internal and external information sources. At the moment, the main internal information sources are the operative information systems. Nonetheless, for the information user the information source is some-

what irrelevant as long as their information needs are satisfied with relevant information. When it comes to information type, more value was given to qualitative information by the team managers, even though quantitative information is needed to satisfy certain information needs, for example most of the information needs in the finance performance perspective. At the same time, multiple interviewees called for information that could better satisfy their information needs: *"Provided information should be easily approachable and analyzable so that it will be used."* (Team manager 3.2.2016). This implies that the team manager's individual capability in making sense of or their ability to interpret the information has been exceeded, which is a sign of information overload.

Even though the team managers are operative level managers, a great amount of the identified information needs is future oriented. This is both because of the small size of the target organization as well as the leadership mentality in managing the organization which favours decentralized decision-making. Typically, future oriented information is needed more often by managers on the higher organizational levels who are required to make a greater amount of unstructured decisions. In the target organization the responsibility for decision-making is divided more equally within the members of the organization. For this reason, the team managers also take part in the strategic and tactical level decision-making, although they might not be the ones making the final decisions.

The team managers' information needs are at least partly as complex due to their versatile job description. In the target organization, the team managers' job description and responsibilities are flexible and at least partly self defined. As one of the team manager described: *"The team managers' job description has not been clearly defined and individuals are given some level of freedom to define their own role."* (Team manager 10.2.2016). What this means is that the role of the team manager as well as their information needs vary according to the personal interests and background as well as the maturity level of the team and its services. For example, one of the interviewed team managers mentioned that his job description differs from a normal team manager's role and responsibilities, as the team had recently launched a new service and therefore at least one third of his time was targeted into sales work.

Besides the role and responsibilities of the team manager, Laitinen (2009) underlines the affect of the organizational context. In this study, especially the type of provided service was noticed to affect the team managers' performance information needs, especially among the teams providing professional services compared to the teams specialized purely on continuous services. For example, utilization which is a central measure in project business is irrelevant for the teams providing continuous services. The team managers mostly use performance information to develop their awareness of the business operations and environment, and in certain cases, the information is also directly used in decision-making. Very often, performance information is used to complement the information the team managers receive from other information sources. According to the literature, the managers' other information sources include informal information

sources, such as meetings, phone calls and informal reports (Laitinen 2009, p. 552) and their own knowledge, which is considered their primary information source (Rouse 2002, p. 283).

Not surprisingly, many of the challenges recognized during the information need assessment were identified in the literature as well. Therefore, it can be said that very common challenges related to information need assessment were noticed during this study. The challenges were related to, for example, the amount of resources required for the information need assessment as well as the team managers' inability to describe their own information needs. Information need assessment, especially the data collection included into the information need assessment process, requires a great amount of resources as people with different roles and expertise are needed to participate. In this study, five team managers, three senior managers and the researcher participated in the data collection. The data collection alone required 27 hours of work when the used hours of all participants were calculated together. The amount of work hours is multiplied when it is taken into consideration that the researcher's work also required the preparation and analysis of the collected data. For many organizations, especially for the SMEs, this is a significant investment. This is one of the reasons why information need assessments are often neglected despite the possible positive outcomes.

Very often users are incapable of describing or anticipating their current or future information needs (Nicholas 2005, p. 5-10). This is partly because information need is not an established term despite its long history. In addition, it can often be difficult for people to separate information need and want from each other as these terms are not completely separated (Nicholas 2005, p. 19). During the interviews, multiple interviewees used phrases like "*information that I want*", "*information that I would like to have*" and "*information about x would be nice to have*" when actually referring to information that they need. Even though the choice of words could be interpreted as a want of information, the need for this information was ensured by presenting defining questions about the use of the information. As Choo (2002, p. 29) explained, expressing information needs to another person is not a simple task, as both members need to understand the decision-making context as well as the ways how this information is to be used. This was also noticed by one of the interviewees: "*When team managers themselves are not aware of their own information needs, how could someone else know these needs for them?*" (Team manager 10.2.2016). This highlights the importance of the used methods as well as the experience of the information professionals when conducting these assessments. In this study, especially the target organization's BPM framework helped in identifying the needs in a holistic manner, which improved the results of the assessment.

The second part of the research question: *What kind of business intelligence capabilities need to be developed in order to support the team managers' work and the performance improvement of the organization more efficiently?*

The team managers have a wide variety of different performance information needs as noticed during the information need assessment. In order to satisfy these needs, both financial and non-financial as well as qualitative and quantitative performance information is needed. Before the study, the supposition was that some of the basic performance information needs of the team managers can be satisfied with the business information provided with the target organizations BI but not well enough to effectively support the target organization's internationalization and growth objectives.

In the target organization, the team managers' activities, such as decision-making, are seen as a high priority, as the decisions have a central role from the target organization's performance viewpoint. This highlights the need to satisfy team managers' information needs in an efficient manner. The target organization's capabilities in satisfying the team managers' performance information needs with its current BI capabilities were determined by conducting a BI current state assessment. During this assessment, the identified performance information needs were compared with the information provided to the team managers with the target organization's current BI capabilities. As noticed earlier, some of the identified information needs are easy to satisfy with the current business intelligence. Nonetheless, this proportion of all the identified information needs is fairly small.

The target organization's capability in meeting the team managers' performance information needs varies between the different performance perspectives acknowledged in the target organization's BPM framework. The current BI capabilities are focused on the performance perspectives of finance, customer and internal process. At the same time, especially the information needs in the performance perspectives of environment, learning and growth and people are inadequately supported. What this means is that the team managers are required to make certain decisions without adequate information to support these decisions. For this reason, the target organization should focus their future BI development especially on these performance perspectives. Even though the performance perspectives of finance, customer and internal process are better supported, multiple information needs in these performance perspectives cannot be satisfied with the current BI capabilities. The target organization's capabilities in these performance perspectives can nonetheless be developed rather easily by developing the current BI capabilities further to better meet the identified needs.

Information that meets the users' needs and wants is referred to as the most value-added information as this information is more likely to be used (Rouse 2002, p. 282). The target organization's BI should be developed further to provide information based on the identified information needs of the team managers. In addition to targeting the organiza-

tion's information acquisition to this most value-added information, it is important that the area of wanted information is also widened. This is because often times organizations also possess information of great value, which users may be unaware of and therefore have not yet wanted, even though there might be a need for this information. Deficiencies in the team managers' awareness of the available performance information provided by the target organization's BI was noticed.

Common challenges in satisfying information needs are shortage of time, lack of training, unavailable access to relevant information and information overload (Nicholas & Martin 1997, p. 49). These challenges were noticed in the target organization as well during the BI current state assessment. Very often, the needed performance information is either unavailable due to the constraints of the BI tool or in a format, which does not effectively support the team managers' tasks, such as decision-making. The term "*management information crisis*" is sometimes used to describe decision-making situations where the required information is unavailable (Daniel 1961). In the target organization's case, the term may exaggerate the situation as only the target organization's formal and controlled BI activities were taken into account during the BI current state assessment. This assessment does not take into account the team managers' primary information source, which is their own knowledge, or the informal information sources used by the managers, such as meetings, phone calls and informal reports (Laitinen 2009, p. 552; Rouse 2002, p. 283). The target organization's business operation is profitable which indicates that correct decisions are mostly being made. Nevertheless, the inadequately satisfied information needs suggest that the target organizations' performance can be improved by developing its BI to better meet the needs.

As defined earlier, business intelligence includes the processes, techniques and tools used to support decision-making (Hannula & Pirttimäki 2005, p. 34). The target organization's BI is currently focused on managing performance information produced with the operative information systems and some other organization specific tools, such as customer satisfaction surveys. The target organization is not currently utilizing data warehousing as a part of its BI operations, which does not mean that it would not be utilizing business intelligence. Nonetheless, as data warehousing is often seen as the heart of the BI architecture and operation, the lack of a data warehouse suggests that the whole potential of the BI has not yet been reached.

The target organization's current BI maturity was determined by utilizing Aho's (2011) maturity model. According to this assessment, the current maturity level is "*information silos*" which is the lowest of the maturity levels recognized in this model. This implies that the target organization's BI is on the early stage of its maturity. Despite the rather low maturity level, the target organization's BI capabilities are higher due to multiple facts, and therefore its maturity can be taken to the next level with rather small changes and development. For example, many characteristics identified in the maturity model can be influenced by improving the PSA system's capabilities. At the same time, most

members of the target organization are technologically oriented advanced IT users, and therefore the time and effort required to implement a new information system or to make changes to the current ones is lower. In addition, the open organizational culture, low organizational hierarchy and positive attitude towards developing the current working methods are present. Nevertheless, the development of the BI capabilities and maturity requires also skills which the target organization does not currently possess.

The challenges in satisfying the team managers' performance information needs are listed in Table 10. This list is created based on the findings of the BI current state assessment. The challenges are listed for each performance perspective individually, even though there are multiple common challenges like "*Tailoring of the PSA system still on-going*" which affect several performance perspectives. By developing BI further, the target organization can influence the current capabilities of the BI tools and in this way affect the identified challenges.

Table 10: *Challenges in the target organization's current BI capabilities.*

	BI tools	Challenges in satisfying the information needs
ENVIRONMENT	<ul style="list-style-type: none"> Enterprise social media Intra portal PSA system 	<ul style="list-style-type: none"> Lack of information concerning the Finnish market due to the industry-specific issues Challenges with information quality and consistency Limited capabilities and resources for competitor and market analysis Challenges in co-operation and information exchange between the team managers, senior managers and sales team members This performance perspective is not in the main focus of the current BI activities
	<ul style="list-style-type: none"> PSA system Accounting system Intra portal 	<ul style="list-style-type: none"> Tailoring of the PSA system still on-going PSA system constraints interfere reporting and business operations Reports do not satisfy the team managers' information needs Team level costs and profitability are unknown Lack of adequate reports for teams providing continuous services Reporting requires manual data gathering and maintenance Team managers lack of knowledge about the available information due to the inadequate induction and training Information at the team managers' disposal is not processed enough to meet their needs
CUSTOMERS	<ul style="list-style-type: none"> Customer satisfaction survey Project management portal 	<ul style="list-style-type: none"> Differing needs between the team managers No dedicated way to measure customer satisfaction of continuous services Project management portal is inadequately utilized in customer communication Challenges in co-operation and information exchange between the team managers, senior managers and sales team members
INTERNAL PROCESS	<ul style="list-style-type: none"> PSA system Project management portal Intra portal 	<ul style="list-style-type: none"> PSA system constraints interfere reporting and business operations Challenges with information quality and consistency Tailoring of the PSA system is still on-going Differing needs between the teams (project based vs continuous services) Inadequate know-how due to lack of induction and training Lack of consistent and clear picture of the company for the managers
LEARNING & GROWTH	<ul style="list-style-type: none"> Employee satisfaction survey CV database Intra portal 	<ul style="list-style-type: none"> Employee satisfaction survey is conducted only once a year Competency management is inefficiently supported Inadequate knowledge sharing Deficient use of CV database This performance perspective is not in the main focus of the current BI activities
PEOPLE	<ul style="list-style-type: none"> Employee satisfaction survey Intra portal 	<ul style="list-style-type: none"> Employee satisfaction survey is conducted only once a year Recruitment is insufficiently supported This performance perspective is not in the main focus of the current BI activities

Based on the difficulties in satisfying the team managers information needs, it can be said that an information gap exists between the team managers' performance information needs and the performance information at their disposal. This gap, which is between the demand and supply of information, describes the current state of the target organization's BI. In order to reduce the information gap, these BI activities should be better targeted to meet the team managers' performance information needs. In order to satisfy the information needs, the right information needs to be in the right place at the right time and in the right format (Choo 2002, p. 42).

The required BI capabilities can be defined by identifying the target organization's challenges in satisfying the team managers' needs. These requirements should be taken into account when planning and prioritizing the BI development activities of the target organization. The requirements for the BI development are multifaceted due to the low maturity level of the BI and also the comprehensive perspective of performance management. Based on the identified BI development requirements, this study suggests the target organization's BI to be developed in two steps. In the first step, the target organization's BI should be develop to meet the identified performance information needs of the team managers. In the second step, the target organization's capabilities should be enhanced to support the internationalization and growth of the organization.

First development step

Multiple required BI capabilities for the target organization's BI development were identified as a part of this study. The first logical development step for the target organization's BI is not to implement a data warehouse even though it is often seen as a central element in business intelligence. Instead, in the near future, the development activities should be focused on developing the current BI capabilities further to better meet the team managers' needs. The most urgent development tasks is the target organization's PSA system so that it satisfies the identified information needs. The system should be aimed to provide reliable reports which are designed based on the team managers' performance information needs. Now that there is a comprehensive understanding of the team managers' needs, it is easier to design these reports to meet these needs.

In addition to the PSA system development, as deficiencies in meeting the managerial performance information needs occur especially in the performance perspectives of learning and growth, people and environment, it is easy to suggest that the BI development should be targeted to these perspectives. During the first BI development step, it is especially important to support business operations in the area of learning and growth and people. In order to support the target organization's recruitment and professional development, a human resource management (HRM) system should be implemented. These BI capabilities are in an important role from the target organization's internationalization and growth perspectives.

Required BI capabilities

- PSA system: Reliable reports which satisfy the team managers' needs
- HRM system: Information system support for the performance perspectives of learning and growth and people
- Capabilities in measuring customer satisfaction in continuous services
- Improved capabilities in measuring employee satisfaction
- Productized information products designed for the use of team managers
- Improved knowledge sharing capabilities with customers

Second development step

During the second step of the BI development, the target organization should invest into the data warehousing. Especially because the true value of BI is achieved by combining data from multiple data sources because in this way, the constraints in the systems' capabilities can be overcome. Usually, these capabilities are created by utilizing data warehousing. In the near future, maybe within a year, the need for a data warehouse will become timely in the target organization.

Regardless of the scope of BI, data warehousing always requires a great amount of time, resources and financial investments. What makes these investments challenging is that a great amount of time and effort is required before any value is achieved. Therefore, the decisions to invest in a data warehouse need to be well planned and scheduled. Even though BI is often approached from the financial perspective, in the target organization's case also the other performance perspectives should be taken into account. In order for BI to be successful, people from different interest groups must be involved when designing the system (Sharda 2014, p. 40).

Watson (2009) identifies three types of targets for BI: support very focused needs on the department level by using independent data marts, support current and future organizational BI needs with the help of data warehousing or support organizational transformation by enabling the implementation of new business models and strategy (Watson 2009, p. 491-492). For the target organization's BI development, the suitable target is to implement a data warehouse, which is able to support its current and future needs.

Required BI capabilities

- Data warehousing: Capabilities in gathering, combining and analyzing information from multiple information sources
- BI system: Improved analytical capabilities
- Dashboard for the use of the team managers
- Enhanced capabilities in market and competitive intelligence
- Master data management in use

7.2 Action recommendations

Three action recommendations can be suggested to the target organization based on the results of the study.

Action recommendation 1: *Develop the current BI capabilities and evaluate the need for a data warehouse*

The target organization should, first and foremost, invest in the development of the BI to better satisfy the performance information needs identified in this study. As noticed earlier, especially the performance perspectives of environment, learning and growth and people are inadequately supported. At the same time, the target organization has objectives for profitable growth and internationalization, which are affected by these challenges in satisfying the needs. For example, the aspects of competitive and market intelligence, skills and professional development as well as recruitment are inadequately supported. Therefore, the target organization should further develop the PSA system reports as well as the customer and employee satisfaction surveys and invest in the team managers' induction, training and continuous support. The target organization should improve the methods in knowledge sharing, especially concerning the information needs of competitors and the market in the environment perspective. In addition, the information needs in the performance perspectives of learning and growth and people should be supported by implementing a HRM system.

At the same time, the target organization should also investigate the need for a data warehouse. With the help of the data warehouse, the target organization could develop its capabilities in gathering, combining and analyzing information from multiple information sources. These capabilities are needed to satisfy some of the identified performance information needs and may also become necessary due to business acquisition in the future. Besides investing in technology, skills concerning data warehousing and analytics should also be acquired by utilizing training or a partnership.

Action recommendation 2: *Conduct periodic information need assessments*

This study was the first time that managerial performance information needs were systematically studied in the target organization. An understanding of information needs is essential when developing the target organization's BI capabilities, as only known needs can be effectively satisfied. This highlights importance of the information need assessment. As these assessments are always time-bound, a periodic assessment of the team managers' information needs is needed in order to detect possible changes. Especially the growing importance of the continuous services as well as the internationalization and growth will presumably change and versify the team managers' performance information needs. This highlights the need to repeat the research at a later time. Future assessments are also less time-consuming to conduct now that the methods and challen-

ges related to the assessment process are known, and the target organization's BPM framework exists.

Action recommendation 3: *Define the BI strategy and objectives*

The BI strategy should be developed based on a comprehensive view of the target organization by taking into consideration both technical and business viewpoints. This documentation should include both short-term and long-term objectives for the development. Aho's BI maturity model described in this study can be used in this process to increase the understanding of the current state of the BI operations and to define the next steps on the BI development roadmap. Before the data warehouse implementation, there is a need to define the level of BI to be achieved based on the business requirements. At this point, the future BI governance also needs to be defined.

7.3 Evaluation of the research

The success of research can be evaluated by looking at the objectives set for the study and by estimating how well these objectives were reached. The objectives of this study could be achieved by conducting the information need assessment and the BI current state assessment, which both succeeded well. The research question of the study could be answered comprehensively and with required accuracy with the data collected as a part of this study. Especially free conversation during the interviews and the focus group discussions enabled a good understanding of the team managers' performance information needs. The requirements for BI development were also identified in a comprehensive manner by assessing the target organization's BI operations from the six performance perspectives.

From a theoretical point of view, the evaluation of the research requires the consideration of the validity and reliability of the study. According to Dorner et al. (2015), both the validity and reliability of the information need assessment are highly dependent on the quality of the data collection as well as the accuracy of the results. The validity of the research requires that the chosen research approach is capable of gathering accurate and relevant data to answer the research question. The reliability, on the other hand, is reached if the study could be repeated by another researcher with identical results. (Dorner et al. 2015, p. 91)

As this research was done by a single researcher, it naturally decreases the scientific reliability of the study, as the findings are based on interpretation and are therefore vulnerable to misunderstanding. In addition, the researcher's previous knowledge of the target organization and understanding of the researched topic affect the results of the study. On the other hand, the reliability has been improved by documenting the study methods as extensively as possible. The use of multiple data collection and analysis methods has also improved the reliability of the study.

In the academic world, the standards for need assessment studies are higher than in private sector organizations. The statistical standards, such as sample sizes and confidence intervals, are usually not satisfied within the studies of organizational decision-making (Watkins et al. 2012, p. 67). Nevertheless, all studies are affected by a group of limitations. In this study, only a small group of team managers in the target organization were interviewed. Therefore, it is clear that a more profound understanding of the team managers' information needs would have required a greater amount of interviewees. However, the involvement of the senior managers in the data collection improves the reliability of the study, especially because of the strategic approach of the business performance management. This suggests that the information needs were identified in a more comprehensive manner instead of collecting data only from the team managers.

The performance information needs of the team managers were identified and prioritized during this study. Based on the collected data, the questions "*what*" information needs the team managers have and "*why*" do they need to know this can be answered. However, the questions "*how*", "*in which format*" or "*when this information is needed*" cannot be answered. For example, the frequency of performance information use in decision-making was not seen as important from the BI development viewpoint as the actual identification of these needs. For this reason, the assessment was focused on the identification and prioritization of these needs.

This research increases the understanding of information need assessment in the context of business performance management. The most significant scientific contribution of this study is the creation of a BPM framework for the use of a SME operating in service business. The BPM framework was then adapted for the use of the target organization in order to support the identification of the performance information needs and to develop the framework further. The use of this framework improved the comprehensive review of the performance information needs. This framework was commended for its distinct presentation by multiple members of the target organization, which indicates its usefulness when conducting information need assessments.

7.4 Future research topics

A vast amount of studies has been conducted concerning the information need assessments of a predetermined group of people, for example the managers of an organization. However, the majority of these studies are focused on documenting the methods used during the information need identification and assessment instead of introducing the identified information needs. Similarly, performance management studies are concentrated on defining the needed performance measures rather than identifying the needs these measures are to satisfy. Hence, future research could benefit from the research of the performance information needs of multiple organizations within a certain industry, which would disclose the most common information needs in that context.

Information need is not a new concept, as studies in this field have been conducted since the 1920s. Nonetheless, these assessments still have an important role especially in the BI process. The main focus of this study was on identifying the team managers' performance information needs in the target organization. Besides the team managers, multiple other members of the target organization are also in a central position from the BI point of view, including for example senior managers, project managers and principal consultants. Before proceeding with the BI development project, especially the information needs of the senior managers should be identified. This is particularly important because the identification of information needs is the first and the most important step in the business intelligence process.

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APPENDIX 1: INTERVIEW QUESTIONS

This interview is part of my master's thesis. The objective for the thesis is to gain comprehensive understanding of the target organization's managerial information needs in the area of performance management so that these needs can be satisfied by developing business intelligence capabilities in the future. Interviews will be recorded with audio equipment to enable deeper analysis of interview responses. Names of the interviewee will not be mentioned in the study report.

The most important terms to understand during the interviews are performance and information need. Performance is a measure which describes how well organization reaches its goals. Information need, on the other hand, refers to information which is needed to perform a certain task or to make a certain decision.

- Do you understand both of these concepts?

BACKGROUND INFORMATION

- How long have you worked for the target organization?
- How long have you been in a managerial position?

MANAGERIAL PERFORMANCE INFORMATION NEEDS

Here is the business performance management framework developed for the thesis, where six performance perspectives and multiple information themes are identified. This is a modified version of the Kaplan and Norton's Balanced Scorecard (BSC) framework. Main difference between these two frameworks is that the original version identifies four performance perspectives instead of six.

- Do you understand the different performance perspectives described in the framework?
- What information do you use as a part of the tasks and responsibilities assigned to you as a team manager?
- What are the most important information needs that come to your mind when you look at the different performance perspectives described in the framework?
 - Why do you need to know it?
 - How will this help you?
 - In what form do you need to know it?

PERFORMANCE PERSPECTIVES

Each of the six performance perspectives will be reviewed individually: environment, finance, customer, internal process, learning and growth and people. Read the list of identified information needs related to the performance perspective.

- What are the most relevant information needs from the team manager point of view?
 - Why do you need to know it?
 - How will this help you?
 - In what form do you need to know it?
- Does this list contain irrelevant information needs?
- Is something missing from the list?